Anthropological Approaches to Zooarchaeology

Colonialism, Complexity and Animal Transformations

edited by

D. Campana, P. Crabtree, S. D. deFrance, J. Lev-Tov and A. M. Choyke

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Front cover: The figure represents the god Quetzalcóatl, dressed as a warrior not in battle but dancing since he shows his shield and arrows resting on his left arm and his weapon, a turquoise snake in his right hand He wears a gold disk over his upper garment, a loin cloth almost covered by a triangular piece tied on the back and over it a turquoise shield. from which hangs another piece with quetzal feathers. The quetzal headdress with the quetzal back piece identify him as Quetzalcóatl, "Plumed serpent". He wears sandals as in battle or dancing. The image comes from from the Codex Magliabechiano edition from 1904.

Back cover: The illustration depicts an offering scene found within the tomb of Tjetu in Giza, Egypt. By Wilma Wetterstrom after an illustration in Giza Mastabas Vol 4, Mastabas of the Western Cemetery, Pt 1. by William Kelly Simpson. Museum of Fine Arts, Boston. 1980. Fig. 24.

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This volume is dedicated to the memory of two colleagues
who contributed to the early shaping of this book in different ways

Oscar Polaco

our friend and colleague who was a leading scholar in Mexican archaeozoology and co-organizer of the ICAZ Conference held in Mexico City in 2006

Photo provided with permission by Ana Fabiola Guzmán

Stine Rossel

a promising young scholar in our field and friend who participated in one of the 2006 ICAZ Conference sessions published here

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Animals and Complexity: How Zooarchaeologists Contribute to the Study of Complex Society in the New and Old Worlds

Justin Lev-Tov and Susan D. deFrance

Animals in complex human societies are often both meal and symbol, related to everyday practice and ritual. People in such societies may be characterized as having unequal access to such resources, or else the meaning of animals may differ for component groups. Here, in this book, 28 peer-reviewed papers that span 4 continents and the Caribbean islands explore in different ways in which animals were incorporated into the diets and religions of many unique societies. The temporal range is from the Neolithic to the Spanish colonization of the New World as well as to modern tourist trade in indigenous animal art. The first section is the most general, containing a variety of studies on the interaction of foodways with complex societies via themes such as status, stratification, feasting, and economics. The second section springs from the first, and in it authors all address one theme in particular, the interaction between diet and colonialism. Our final section explores the complex role that animals, and parts of animals, play in all human societies as religious, identity markers, or other types of symbols. Animals are not only passive actors but, as creatures living intimately with their human counterparts, are actively used by people to express beliefs about human interactions and beliefs.

This volume is organized according to these themes rather than according to geographic location or time period. We believe that – clearly – these issues crosscut both such divisions. In so doing, we hope that this book will present an opportunity for scholars divided by geography especially, but also by temporal period, to read about each other's research and perhaps to bring these ideas into their own research, even if it is regionally and temporally divergent from the examples offered here. In other words, different archaeological settings can perhaps address the same problems cross-culturally.

Because the volume is arranged not along the lines of time and space demarcation, but rather as a series of case studies of revelations of diet for the study of social complexities, what follows are some general remarks about themes the essays address. Just as the papers presented here cover many of the subjects traditionally focused on within the study of complex societies (cf. Crabtree 1990), it is also interesting that they address their subject matters in distinct ways.

Research themes that emerged prominently in this realm of zooarchaeology include the origin of state societies and the development of centralized control over agriculture and specifically meat distribution to urban, presumably non-food producing, residents. Other subjects treated quite a bit in the literature concern the internally divided populations that typify and even define complex civilizations. Populations in such societies are divided by group origin or identification, that is to say ethnicity, by access to power and wealth, in other words status and class, as well as gender roles. Arguably, an offshoot from the study of status and wealth relations through diet has been the employment of zooarchaeology in the study of colonialism. Colonialism, since it is ultimately about relations of power and the negotiation of identity between intrusive and indigenous groups, or even two intrusive groups, lends itself well to the study of animal use and diet. Food is a locus of culture at once public and private, shared at the community level and held private within the family. As well, food has often been a means by which dominating groups have tried to complete their cultural conquests, consciously or not. Building on the theoretical chapter by Campana, the case studies by De Nigris et al. examine the role of hunger in a Spanish colonial setting in Tierra del Fuego. Elsewhere in the Spanish Empire, studies by Tarcan and Driver and Pavao-Zuckerman address the indigenous response to Spanish colonization of the American Southwest and northern Mexico. The paper by Gifford-Gonzalez provides an interesting critique of the questions being addressed by zooarchaeologists researching the American Southwest.

At times, the processes that shape diet in complex societies are woven closely together. Within the archaeology of colonialism, Dietler (2007) has argued that "goods, and especially foods, have not only been appropriated and indigenized, but they have also been used by both parties in colonial situations to attempt to control the other." Several authors in this volume examine ancient Roman colonialism in Europe and North Africa, seeking to separate indigenous from native carnivory. Crabtree as well as Lyublyanovics set out to study the effects of Roman colonialism on diet in different parts of Europe, but along the way wind up considering questions of identity, what is native and what is Roman, rather than purely economic and political questions. MacKinnon demonstrates the remarkable dietary changes which took place in ancient Carthage at the time of the Roman conquest, and how those trends waned as the Roman hold on the city weakened. In these colonial situations, subordinate groups may resist such actions by retaining pre-existing foodways or even cooking up a creole of traditions.

Other papers in this volume examine the intersection of diet and empires from alternative perspectives. Lev-Tov's paper examines the effects the Neo-Assyrian Empire's conquest of the Levant had on the diet of Philistines there, wherein the local people's diet was changed to accommodate the commercial interests of the colonizers. A similar issue of the role of empire expansion on the local use of animals is addressed in the paper by Capriles *et al.* in their examination faunal remains in pre and post-Inka contexts from the site of Yoroma in Bolivia. Despite evidence from surrounding sites to the contrary, the latter authors demonstrate that Inka political dominance at this site did not lead to dietary changes. DeNigris *et al.* present the sole study of a failed colonial adventure, this one in southern Argentina, where a Spanish settlement failed after only a few years, despite – or because – the colonists out of necessity had taken to hunting some of the wild animals that native hunter-gatherers had also pursued.

The animal link between many societies that were colonized, and the colonizers, has been, more than the dietary staples brought with them on the hoof and consciously, the commensal fauna that sometimes preceded but always accompanied such efforts. O'Connor discusses commensal animals, their importance and their categorization. These fauna occupy a gray zone between the wild and domestic, and therefore, escape our attention despite the key role such animals have played. Vretemark and Sten address another sort of companion to humans, dogs. They study how that animal played multiple societal roles, as pets, actual and symbolic guardians, and ritual food in their study of Neolithic canid remains from a Hungarian Bronze age fortified site.

While our conceptions of some animals are almost nonexistent, with others we entertain nearly uniformly negative views. In this volume Gonzalez demonstrates how sharks in Brazil formerly held special status, as seen in the frequency of different species' skeletal elements as they occur in settlements vs. burial mounds. The implication, of course, is that rather than feared and loathed, certain shark and other elasmobranch species were instead sacred. If human societies of all kinds have complex and non-economic relationships with various species, certain animal body parts also have special status outside of food considerations. Similarly, Cooke and Jiménez address the cultural attitudes that ancient Panamanians had toward varied tropical animals and how animals and their products were used to establish hierarchy and status.

Clearly, one such arena of belief would be animal sacrifice, whether the custom involved is the selection of species to ritually slaughter and how to preserve the magic of the act, or which portions of the body might have more power than others. Two papers in this volume touch on these subjects, as Daróczi-Szabó examines a pagan Hungarian practice, continued into the Christian era, of burying sacrificed animals in upside down pots, while MacKinnon's examination of side preference in ancient sacrificial portions focuses on ancient Greece. In the latter paper, the author draws an interesting parallel to human handedness that may have influenced sacrificial preferences. Morris addresses the ways people used Associated Bone Groups (ABGs) in distinct contexts in Neolithic to medieval period sites in southern Great Britain to create meaning including changes in animal use following "Romanization" of the region.

Gumerman (1997, 106, 114, 116) pointed out that food is intrinsically social, in that people choose to eat or avoid certain foods and base their decisions on concerns such as the status or identity values it connotes. Part of the reasons for this has to do with the fact that consumers are not always, the producers in such societies. Here, contributing scholars use different case studies from Europe to assess the extent to which studies of animal bones may help us understand the identity of the Celts in Europe. Stallibrass draws on evidence of articulated and burned bones deposited within pits at a Hellenistic period site in Bulgaria, to argue that the Celts were at least one component of the city's population. In another study of identity and animal bones, Bartosiewicz and Gál draw on both unworked and worked bone data from multiple sites in a border area of Hungary to attempt to sort out which ethnic groups inhabited certain sites. The relative abundance of steppe animals within an earlier sample suggests that so-called Scythian peoples occupied the area at least in part, while the later collection, with higher amounts of pig bones, has more of a settled, Celtic character to them. The authors nonetheless argue that the assemblages do not provide profiles completely compatible with either group showing that the frontier area was typified by interaction rather than rigid cultural borders.

Other papers in the volume tread more familiar, but no less intriguing, ground, covering the important themes of provisioning, how urban residents obtained their food, whether through independent means or via governing officials, often elites, who distributed animals or meat to non-food producing classes of workers. The development of these types of distributive hierarchies is one of the general defining characteristics of the state, and it is therefore interesting that the two papers that explore that theme, both using datasets from the Near East, come to opposing conclusions regarding their sites. Redding examines the diet of the workers who built one of the pyramids of Egypt, and argues that the status of different workers is visible in the types of meats they were provided. Status is not only visible in the (zoo)archaeological record, the state identified certain peoples' statuses by prescribing a diet for them. Allentuck and Greenfield, however, found no visible link between status and diet based on their study of faunal remains from a similarly early state-level site, this in Turkey. While these two papers come to different conclusions, they both take a bottom-up approach to the study of diet.

The archaeological delineation of status has long occupied archaeologists and zooarchaeologists studying the sites of complex societies, deFrance's recent (2009) review of zooarchaeological approaches to status highlights the challenges of the subject, perhaps the most critical being that class-based dietary choices vary highly from one time and place to another. In Mid-Continental North America Kelly examines how birds, or parts of them, were transformed from beasts to powerful symbols as a part of communal feasts that involved many segments of society at Cahokia. In the present volume, deFrance illustrates the difficulty in discerning high status food and animals that might have been used in feasts by an emerging Puerto Rican chiefly society. Although it is widely recognized that a stratified society existed in that study area, social differentiation evidently was not symbolized via access to different animals incorporated into the population's diet.

State religion(s) and elaborate rituals are of course a hallmark of societies throughout time, so it is only natural that such worldviews would extend also to the realm of animals in culture. Not only what people ate, and sacrificed, but certain animals or even skeletal elements can themselves become ritual objects derived from cultural beliefs about the biological animals in which they originated.

Taking up these themes, a number of papers in this volume address the transformation of animals, and bones, into objects of special interest and/or devotion for past peoples. Choyke presents an overview of the topic, demonstrating how societies past and present have imbued various animals with magical properties. In addition, Choyke discusses bone amulets found in Hungarian early medieval graves as examples of the transformative process, from living animal, to bone, to carved object with prophylactic powers. Other examples presented here include the significance of the quetzal bird to the former state societies of central Mexico (Aguilermo) and the transformation of bird feathers and skeletal elements into powerful material symbols for Mississippian elites (Kelly). Using artwork from Bronze Age Armenian sites as a basis for discussion, Manaseryan demonstrates that the depiction of animals using metal and other materials was done in such a way as to emphasize certain species' behavioural or physical characteristics esteemed by ancient societies there.

The material and symbolic transformations through time of tupilaks, that is, items carved from whale ivory by the native population of Greenland (Sims and Yates) has relevance both to understanding the indigenous Inuit but also modern economics of trade in endangered animals. Thus, during the Neolithic period of southeastern Europe, as Trantalidou's paper details, it was the skulls of cattle, both real and imitated in clay that held some kind of special, symbolic significance for those peoples.

The chapters that follow take up the above and other diverse themes, all in the pursuit of the ways in which past societies manipulated animals, meat, and the products derived from animals as raw materials, to give expression to a number of social processes. Zooarchaeology, however, is not an end in itself, but rather a subfield that contributes to the overall picture of past lives and societies unravelled through archaeological study. These essays demonstrate the utility of animal bone studies in aiding the understanding of past hierarchical and multiethnic social systems.

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PART I

ARCHAEOZOOLOGY AND SOCIAL COMPLEXITY

editors
Susan D. deFrance and Justin Lev-Tov

1. A Bird's Eye View of Ritual at the Cahokia Site

Lucretia S. Kelly

Over the last century, and particularly the last 50 years, large quantities of faunal remains have been excavated and studied from sites in the American Bottom, a region in Illinois where the largest Mississippian (AD 1020–1400) mound center, Cahokia, is located. A large faunal database has been amassed enabling the delineation of significant patterns regarding the use of various species of animals over time. In this chapter I examine the potential ritual significance of several rare bird taxa found at the Cahokia site in two locations separated in time by about 150 years. One area, sub-Mound 51 that dates to the Lohmann phase AD 1050, contains the remains of large communal ritual feasts. The second area, Mound 34 that dates to the Moorehead phase AD 1200–1275, was a significant locus for special activities, events, and religious ceremonies. I present three lines of evidence, zooarchaeological data, archaeological context, and ethnographic and ethnohistoric accounts of how American Indians in the mid-continent used and regarded the identified archaeological bird species to help elucidate what roles they may have played in ritual and ceremonial activities in the past. The bird remains present also contribute to ongoing studies regarding a significant change in symbolism and ideology in the region at the end of the twelfth century.

Keywords: ritual, bird, Mississippian, Cahokia, symbolism

Introduction

Within the North American mid-continent and southeast, the late prehistoric (AD 1000–1500) Mississippian Cultural Tradition includes communities that reflect relatively complex forms of socio-political organization, characterized as chiefdoms. They possess common features such as distinctive ceramic technology, the presence of platform mounds and plazas, dependence upon maize agriculture, extensive exchange networks, ranked socio-political structures, and a shared ideology. The Cahokia site, an early Mississippian center on the northern edge of Mississippian development, is located in the American Bottom region of the central Mississippi river floodplain, just east of St. Louis, Missouri (Fig. 1.1). As the largest Mississippian site with over 100 mounds within a 14 sq. km. area, Cahokia undoubtedly represents the most complex of all Mississippian societies. Over the last century, and particularly the last 50 years, large amounts of faunal remains have been excavated and studied from Cahokia and the surrounding region (Kelly 1997, Kelly and Cross 1984, Parmalee 1975) resulting in a large faunal database enabling the recognition of interesting patterns regarding various taxa of animals over time (Kelly 2000).

In this chapter I examine the ritual significance of several rare bird taxa found at two locations in the Cahokia site (Fig. 1.2) separated in time by nearly 150 years: sub-Mound 51 dating to the Lohmann phase AD 1050–1100 contains the remains of large communal ritual feasts (Kelly 2000, 2001; Pauketat *et al.* 2002) and Mound 34 dating to the Moorehead phase AD 1200–1275 is a significant locus where special events and religious ceremonies took place (Brown and Kelly 2000; Kelly *et al.* 2007). I present three lines of evidence to help elucidate the various roles in ritual and ceremonial activities that these birds may have played in the past: zooarchaeological data, archaeological context, and ethnographic and ethnohistoric accounts of how American Indians in the mid-continent used and regarded the identified archaeological bird taxa. The bird remains present also contribute to ongoing studies regarding a significant change in symbolism and ideology in the region at the end of the twelfth century (Kelly *et al.* 2007), referred to by James Brown (2001) as the Moorehead Moment.

A rich avian iconography exists from the late pre-contact Mississippian period throughout the Southeastern United States, including those of birdmen with hawk or falcon attributes (Brown 2007), owls (Aftandilian 2003), and

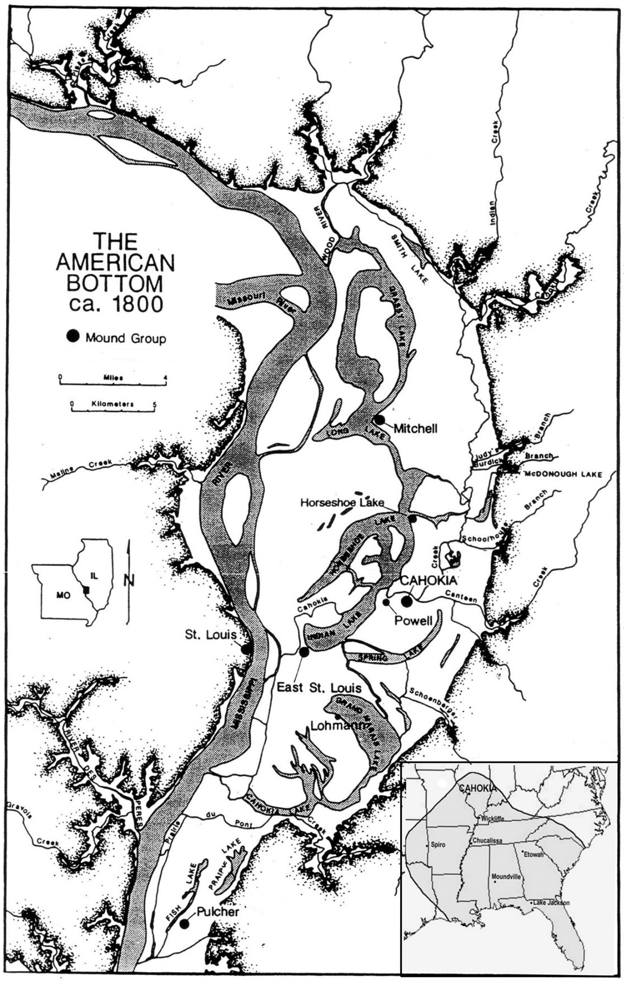

Figure 1.1. The American Bottom region showing location of Mississippian mound centers, with an insert showing the extent of the Middle Mississippian cultural tradition. (From Kelly 2001, fig. 12.1 with permission of Michael Dietler and Brian Hayden).

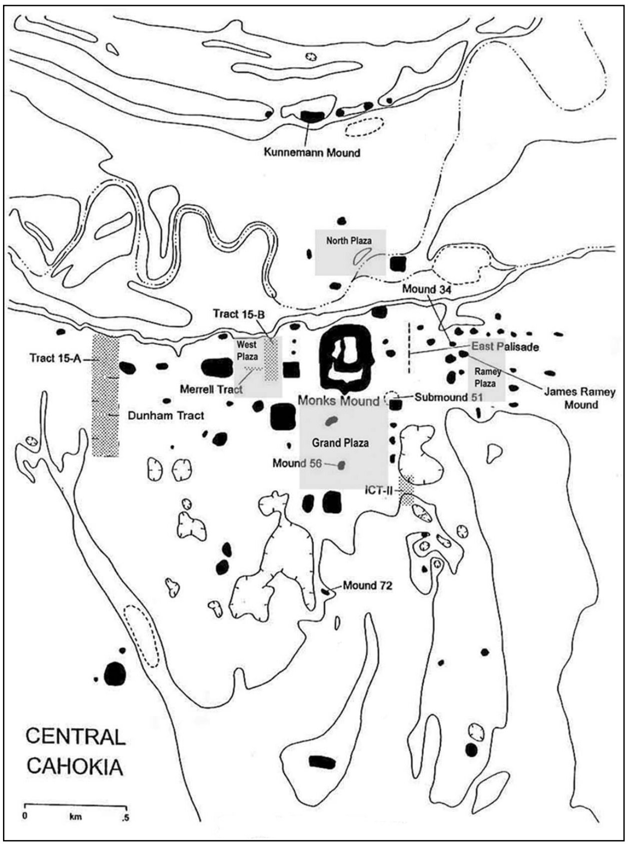

Figure 1.2. Map of Central Cahokia showing location of faunal assemblages and plaza arrangement.

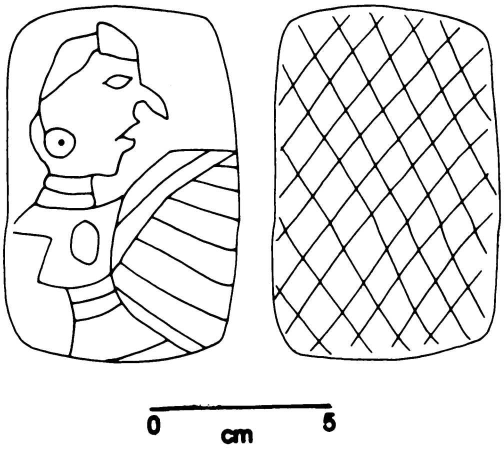

Figure 1.3. Birdman tablet from Cahokia Mounds Ramey Tract. (Modified from Brown and Kelly 2000, fig. 4a).

"duck effigies" (Kelly 1993). The symbol most associated with Cahokia is a birdman image (Fig. 1.3) found incised on a small sandstone tablet (Williams 1975) that dates late (ca. AD 1300) in the site's history. But, ethnohistoric accounts illustrate that many species of birds played important roles in all aspects of American Indian life. Because Cahokia was abandoned late in the thirteenth century before European contact, there is no direct connection between historic American Indian groups and the inhabitants of Cahokia. Because of striking similarities between Dhegiha-Siouan speaking groups such as the Osage, Omaha, and Quapaw and Cahokian society, some scholars now believe these groups may be the direct descendants of Cahokian populations (Hall 2004, 2007; Brown 2007). Early European explorers that traversed the Southeastern United States came into contact with American Indian societies that archaeologists refer to as Mississippian peoples, and who historically are known as Muskhogean-speaking groups such as the Creek, Choctaw, Chickasaw, and the Iroquoian-speaking Cherokee. Therefore the Dhegiha-Siouan and Muskhogean ethnohistoric literature are potential sources for analogs to help interpret the birds found at Cahokia.

Cahokia Excavations and Contexts

The Cahokia site originally contained more than 100 earthen mounds. Monks Mound stands 30.5 m tall, covers about 6–7 ha at its base, and faces the 16 ha Grand Plaza

(Holley *et al.* 1993). Three smaller plazas (5–12 ha) flank its three other sides (Fig. 1.2) (Kelly 1996). On the northeast edge of the Grand Plaza, about 150 m southeast of Monks Mound, stood Mound 51. In the 1960s when much of the Cahokia site was still in private ownership, this mound was removed and sold for fill-dirt. Archaeologists James Porter and Charles Bareis were allowed to conduct some excavation of the mound area prior to the final removal. They discovered that the mound was built on top of part of a reclaimed borrow pit (Bareis 1975). This pit is estimated to have measured at least 50 m north-south and 20 m east-west and was 3 m deep (Chmurny 1973; Pauketat *et al.* 2002). It was rapidly filled in, possibly within 1 to 3 years by seven very distinct, stratified, fill zones that were quite homogeneous across the pit. Very large amounts of material were needed to create these fills. The animal and plant preservation in these zones was extraordinary, in part because of the very rapid filling-in that created an anaerobic environment (Chmurny 1973; Kelly 2000, 2001; Pauketat *et al.* 2002).

The experts who performed the analyses on the very large quantity of excavated materials from sub-Mound 51 concluded they were the result of ritual feasting activity that involved large numbers of people from all segments of Cahokian society (Kelly 2000, 2001; Pauketat *et al.* 2002). The faunal assemblage was different from any other American Bottom site including other areas of Cahokia. It possessed classic feasting signatures including: low sample diversity (over 99% of total mammal bones were deer), high meat yielding species, bulk meat cuts, bulk cooking, little butchering debris, bones not completely broken or disarticulated, and large quantities of bone in a single deposit (Hayden 1996, Jackson and Scott 1995, Kelly 2000).

The Mound 34 area (Fig. 1.2), the second area of Cahokia with very large and significant faunal assemblages, is located northeast of Mound 51, and about 400 m directly east of Monks Mound. It is at the north edge of a line of mounds that define the western boundary of the Ramey Plaza. Past and recent investigations here are providing significant information about the site's Moorehead phase (AD 1200–1275) occupation and about the mound's morphology and contexts (Brown and Kelly 2000; Kelly *et al.* 2007). In 1950, James Griffin and Albert Spaulding (1951) conducted test excavations into the mound. In 1956 Gregory Perino (n.d.) of the Gilcrease Institute conducted extensive excavations into Mound 34. Excavations conducted by James Brown and John Kelly from 1998 to the present have been redefining Perino's earlier work to obtain detailed profile maps and to better understand the contexts of the material he recovered, which includes finely made arrowpoints, spatulate celts, a chert spade, real and chert effigy sharks' teeth, wooden bowl fragments, negative painted pottery sherds, copper nuggets, among other items. A fragment of an engraved marine shell cup found in the Michigan test excavations, as well as 12 fragments from the Gilcrease excavations, provided the impetus for Jim Brown and John Kelly to conduct the recent investigations. These cup fragments are engraved with Braden style designs that epitomize the Southeastern Ceremonial Complex (SECC), a late pan-Mississippian iconography that was wide-spread in the US Southeast. They can now be placed firmly in the Moorehead phase, which puts Cahokia in the mainstream of SECC development (Brown 2004; Brown and Kelly 2000). In addition, it is being revealed that this area of the site in the Moorehead phase was a significant locus where special activities, events, and religious ceremonies were taking place and indicates the site was not yet in a state of social decline (Brown and Kelly 2000, Kelly *et al.* 2007, Trubitt 2000) as previously thought (Emerson 1997, Pauketat 1994), although the population at the site had declined from its peak during the preceding Lohmann and Stirling phases (Milner 1998).

Perino's excavations were approximately one acre in extent and included Mound 34 and nearby areas of the Ramey Tract to the north and west. He recovered a large quantity of well-preserved animal bone from both areas. Paul Parmalee (1957) identified nearly 9800 pieces of bone from Perino's excavations, and published in a single list an impressive array of fauna: 10 taxa of fish, one of frog, 5 of turtle, 58 of birds, and 19 of mammals. I examined Parmalee's original identification sheets on file at the Illinois State Museum and use the general provenience data they provide to separate the fauna from his single list into two assemblages – one from the Ramey Tract and the other from Mound 34. The Mound 34 assemblage is highlighted here. Although exact provenience data from Perino's excavations is limited, Kelly and Brown's recent excavations shed some light on where within Mound 34 Perino's faunal material may have been derived.

Faunal Remains

Much of the animal bone may have come from the D zone, a deposit used in the construction of an initial platform, approximately 70 cm in thickness. Throughout the D zone are lenses or deposits of ash and charcoal and large amounts of animal bone can be observed in the profile walls. The D zone fills also extend into a large refuse trench (Feature 3) under the mound (Kelly *et al.* 2007). Although the context of the faunal remains from this area of the site is not as secure as those from sub-Mound 51, the amount of material suggests that feasting and other ritual activities were taking place as this stage of the mound was being created.

One of the striking features of the faunal assemblages from sub-Mound 51 and from Mound 34 is the rare bird taxa present. A total of 25 bird taxa, 13 of which are ducks, were identified from the sub-Mound 51 pit (Kelly 2000, Chmurny 1973). Two taxa, swan (*Cygnus)* and prairie chicken (*Tympanuchus cupido)* not commonly recovered archaeologically in the American Bottom region, however, together represent 37% of the bird assemblage. Three other rare bird species, bald eagle (*Haliaeetus leucocephalus*), possible red-tailed hawks (cf. *Buteo jamaicensis*), and peregrine falcon (*Falco peregrinus*), are represented in low numbers by wing elements.

The Mound 34/Ramey Field area had a much greater variety of birds present with 58 taxa identified (Parmalee 1957). After isolating the remains recovered from Mound 34 from those recovered from the Ramey Tract, and after grouping the waterfowl remains into categories of swans, geese, puddle ducks, and diving ducks, the number of taxa or bird categories represented is reduced to 36. The variety of waterfowl in Mound 34 is over three times greater than was found in sub-Mound 51.

About three-fourths of the bird NISP from the 1956 Mound 34 excavations is waterfowl, which is typical for assemblages at Cahokia. Swans, however, make up 20.6% of the waterfowl remains at Mound 34 and this is unusual for the site. The remaining quarter of the Mound 34 bird assemblage reveals some other striking aspects. Nine bird species, great blue heron (*Ardea herodias)*, swallow-tailed kite (*Elanoides forficatus*), red-shouldered hawk (*Buteo lineatus*), rough-legged hawk *(Buteo* cf. *lagopus*), golden eagle (*Aquila chrysaetos*), kestrel (*Falco sparverius*), Carolina parakeet (*Conuropsis carolinensis*), great-horned owl (*Bubo virginianus*), and ivory-billed woodpecker (*Campephilus principalis*), are not reported from any other area of Cahokia. If the area is expanded to encompass assemblages from other areas of the Ramey Plaza, an additional 15 species occur only in this area of the site: pied-billed grebe (*Podilymbus podiceps*), white pelican (*Pelecanus erythrorhynchos*), great egret (*Ardea albus*), American bittern (*Botaurus lentiginosus*), Cooper's hawk (*Accipiter cooperii*), marsh hawk (*Circus cyaneus*), long billed curlew (*Numenius americanus*), woodcock (*Scolopax minor*), whimbrel (*Numenius phaeopus*), upland sandpiper (*Bartramia longicauda*), sanderling (*Calidris alba*), barn owl (*Tyto alba*), screech owl (*Otus osio*), short-eared owl (Asio flammeus*)*, and raven (*Corvus corax*).

What is anomalous about the birds in these two lists is that very few, if any, would be considered food items, and therefore, these remains may have been deposited here because of their use in ceremonies or rituals. Birds of prey, eagles, hawks, and owls, are more commonly associated with ritual because they are portrayed in Mississippian iconography. Swans and prairie chickens have not generated much attention as taxa for probable ritual use because they are rarely depicted (or at least identified) in Mississippian iconography.

Space does not permit analysis of all the birds that may have been used in ritual; therefore, 5 taxa of birds that appear to have been important ritually at Cahokia will be examined: swans, hawks, eagles, owls, and woodpeckers. Swans are emphasized to a greater degree than the other four because of their uncommon archaeological association with ritual.

Swans

One might think that swans, in particular trumpeter swans (*Cygnus buccinator*), being the largest waterfowl in the American Bottom with an estimated meat yield of 6.3 kg or 17 lbs (Smith 1975), would have been important economically, as were the other but smaller waterfowl of geese and ducks. But, in reviewing the distribution of the American Bottom swan remains spatially as well as temporally, an intriguing pattern is evident. While duck and goose remains make up the majority of American Bottom bird assemblages, swan remains are infrequent (Kelly 2000; Kelly and Kelly 2007).

Several factors may explain why swan remains are infrequent. Non-cultural reasons might include their behavior, their availability in the area, and how well their remains preserve. Cultural factors might include either the mundane such as taste preference or the more esoteric where swans were symbolically important and used primarily in rituals and ceremonies. Access to swans may have been restricted to specific individuals depending on either status or their position within the society. Most non-cultural reasons can be ruled out, although the availability issue cannot be resolved completely because the trumpeter swan was almost extirpated in the 20th century. Belrose (1976) approximated its former breeding and wintering areas, however, and the American Bottom is within the former breeding area and just to the north of the wintering area in the lower Mississippi River valley. The flyway for tundra swans (*Cygnus columbianus*), on the other hand, extends across Alaska down through Canada to North Dakota and Minnesota then across the northern US to the east coast. The flyway excludes the American Bottom. However, it is possible some individuals may have occasionally migrated down the Mississippi River to be in the proximity of Cahokia (Bohlen 1989).

Cultural factors are more difficult to decipher. As mentioned, direct analogy and archaeological evidence for pre-contact American Indian belief systems are limited, but ethnohistoric and ethnographic accounts of southeastern groups and midwestern Siouan speakers, particularly Dhegiha-Siouan speakers, can provide analogs.

The archaeological distribution of swan bones is distinct for the American Bottom region. Temporally, swan remains are restricted primarily to the earlier part of the Mississippian period, AD 1050–1275. Cahokia, the paramount center, has the majority of remains. There is also an interesting distribution of swan remains within the site. They occur in 14 of 16 areas of Mississippian occupation at the site that have been surveyed for bird remains; however, sub-Mound 51 and Mound 34 have the largest numbers by far.

At sub-Mound 51, 215 swan (both trumpeter and tundra swan) remains make up 19.8% of the bird NISP identified to a taxon below the class level. The majority of these remains were recovered from one of the zones, D2, where 195 swan NISP equal 25.5% of bird NISP from that zone. Wing bones commonly make up a greater percentage of the bird bones recovered in American Bottom assemblages; however, only 4 swan wing bones, 3 of which were cut, are present. In contrast to the swan remains, 31% (NISP=58) of the 187 prairie chicken remains from sub-Mound 51 are wings bones.

From Mound 34, 343 swan bones, mostly trumpeter swan, were identified. The interpretation of these specimens is more difficult because they were recovered from the 1950s excavations and knowledge of their exact contexts is limited. The Mound 34 swan assemblage differs from the sub-Mound 51 assemblage in the body parts represented. For the 343 swan remains associated with Mound 34, 149 or 43.4% are wing bones. Parmalee (1957) notes that many wing bones, particularly humeri from the Mound 34/Ramey Tract combined excavations, were cut.

Outside the Mound 34/Ramey Field and sub-Mound 51 areas only 60 swan bones or 9.7% of the total have been recorded from Mississippian contexts at the Cahokia site (Kelly and Kelly 2007). At Mississippian sites outside Cahokia in the American Bottom, few swan bones have been found and all are wing bones, of which 2/3 are modified. And, except for one bone, they occur at the three subsidiary mound centers of East St. Louis, Mitchell, and Horseshoe Lake (Fig. 1.1).

The spatial distribution of swan remains at Cahokia and the outlying American Bottom sites indicates that swans were treated differently from birds used for food. The body part distribution and bone modification suggests that wings were targeted for use. Few finished artifacts made from swan bones have been recovered in the Mississippian period. Most modified bones represent residue from the manufacturing process. Parmalee (1957) suggests the bones were being used for beads. Artifacts that have been found, however, are pointed tools that may be awls or shuttles. Apparently, the swan wings had special meaning and may have been regulated, most likely by ritual specialists at Cahokia, and distributed only to certain personages at other mound centers and possibly within Cahokia itself. What we cannot easily discern from the archaeological record is the special meaning and the role that swans may have played in Cahokian ideology, ritual, and ceremony.

A sample of the ethnohistoric and ethnographic literature is presented that provides insight into how swans have been used by American Indian groups in the mid-continent and what meanings may be associated with them. When swans are mentioned in the various sources (see below), the parts used are skins, feathers, and wings. Unfortunately, skins and feathers usually do not preserve archaeologically in the mid-continent so not all aspects of swan use are being recovered. Recently, however, a previously archaeologically hidden use of swans has come to light. Some of the fabrics recovered from the Mississippian site of Spiro in Oklahoma (Willoughby 1952) that were studied recently were found to be made of feathers from trumpeter swan, wild turkey, and Canada goose and were twisted together with other materials – such as rabbit, bison, and human hair (Rogers 2002). Rogers *et al.* (2002) believes the samples studied may belong to blankets or mantles worn by elite personages.

> *He said there was a holy bird which was the leader of all animals about the lake. This holy bird was the white swan and the birds flocked in sevens and fives. He said that the down near the left wing should be worn on the head. The left wing of the bird would be a symbol of its power.* (Fletcher and La Flesche 1972, 514)

From the above quote the Omaha viewed the swan as a holy bird. I thought the importance of left wing and feathers may constitute a prediction that could be tested zooarchaeologically, until Bob Hall (personal communication 2002) cautioned that interpreting the importance of side based on ethnographic analogs is not straight-forward, and the choice of side may vary depending on the tribe and the type of story or myth being interpreted.

Osage ethnohistoric accounts make it clear that the swan played a prominent role in a number of rituals. The swan was one of a number of life symbols for two different subclans. One was the "Radiant Star" subclan of the Bear Clan; the other was the "Porcupine" subclan of the Puma Clan (Bailey 1995). Life symbols were held up as exemplars for certain behaviors that help sustain life (Bailey and Swan 2004). The swan was chosen most likely as a life symbol because of its strength and endurance. Swans protect their nests to their death to ensure survival of the next generation. Long life and survival are emphasized in Osage society for tribal unity and perpetuation (Bailey and Swan 2004).

Purity and peace are symbolized by the white swan in the Osage Sky ritual (La Flesche 1939). Swan skins were also used on Osage War Standards. One type is a wooden staff 2 m long with a crooked top that was encased in a deerskin, and was then wrapped with one swan skin cut in a long strip. The swan skin has been plucked of its feathers but the down remains. Twelve eagle feathers were attached by thongs to the front of the standard (La Flesche 1939). On another type of War Standard the white tail feathers of the trumpeter swan are a primary war symbol as are feathers of crows and golden eagles. The great horned owl tail feathers at the top of this standard represent death and destruction (Bailey and Swan 2004).

A pair of the crooked standards would be carried into battle and, when they were placed together to form a heart shape, it signified the Osage were completely unified in their war effort. The heart motif is an Osage artistic symbol that has strong cosmological association with life and death issues. It represents the mating of trumpeter swans, which are associated with the union of sky and earth that makes all things possible. White feathers represent sky, masculinity, and peace while the black feet and beaks refer to death, war, and femininity (Bailey and Swan 2004).

To the northwest of the Osage, the Hidatsa Goose Society, a woman's organization, performed a corn ceremony twice a year in honor of the mythical Old-Woman-Who-Never-Dies to ensure abundant corn crops. Certain water birds sent by Old-Woman-Who-Never-Dies symbolize various plants: geese:corn, ducks:beans, and swans:squash (Lowie 1916). At Cahokia there are a number of associations of swan bones and squash seeds or unique accumulations of water bird remains. A faunal assemblage from a pit on the edge of a plaza/courtyard in the residential area of the Interpretative Center Tract II, southeast of the Grand Plaza was made up of 96% bird bones of which 93% were wing elements. All the birds represented were water birds, two

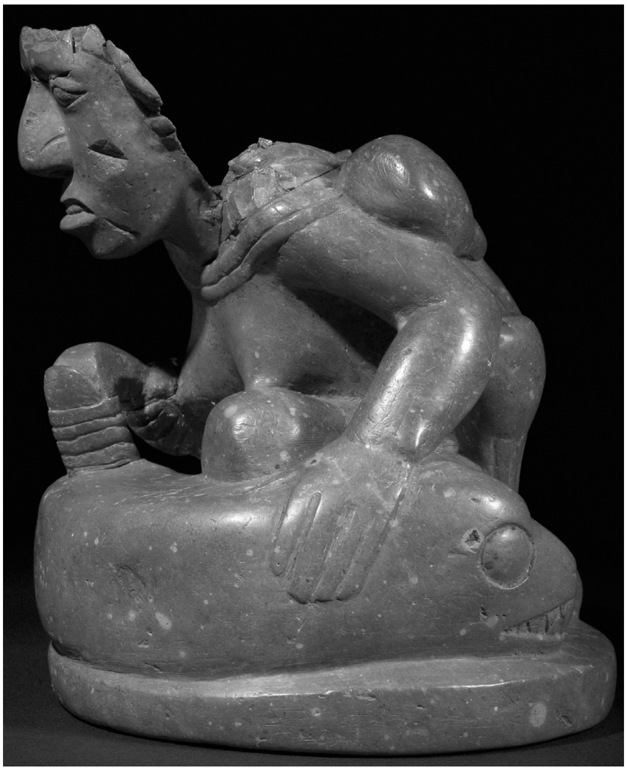

Figure 1.4. Birger Figurine recovered from the Mississippian BBB Motors site. Photo by John B. Taylor.

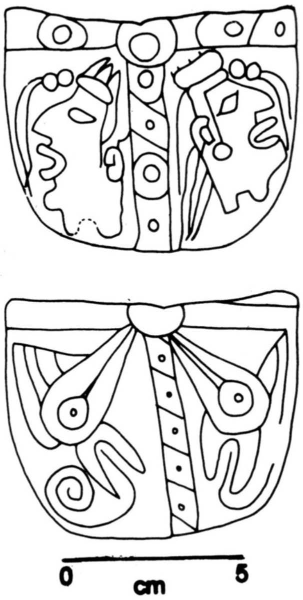

Figure 1.5. Ramey tablet from Cahokia Mounds showing both sites. Top view shows severed heads; bottom view shows ivory-billed or pileated woodpeckers. (Modified from Brown and Kelly 2000, fig. 4b).

of which were swan (Kelly and Kelly 2007). The swan and squash connection may be present in the sub-Mound 51 pit where swan bones make up the 2nd largest number of bird bones and large quantities of uncarbonized squash seeds were recovered (Kelly 2000). Squash has been connected with fertility at Cahokia especially as depicted on the fireclay Birger figurine (Fig. 1.4) where squashes, identified as cushaw squash (*Cucurbita argyrosperma* spp. *argyrosperma*) (Fritz 1994), are growing up the back of a woman hoeing the back of a serpent (Emerson 1982).

The use of swan skin and feathers has been recorded for other groups, such as the Chickasaw who treated swans with respect and admiration (Price 1994). In Capt. Thomas Nairne's journal (Moore 1988, 48), he states "Swans feathers are great ornaments among the Chickasaws. They are taken out of ponds, with lights in the night." Depicted in the Great Seal of the Chickasaw, the band crossing over War Chief Tishomingo's left shoulder and passing under his right arm is known as the Warrior's Mantle and is made of swan feathers. It is a traditional decoration for great warriors (Anonymous 2007, Gibson 1971).

Swan skin and feathers also had a role in the Chickasaw Green Corn Ceremony. In this ceremony a high priest made the new fire and "on his head he wore a piece of swan skin, doubled and wrapped around so that only the white feathers showed, and on the crown of his head he wore a tuft of white feathers [swan?]" (Hudson 1976, 371). An "unsullied wing of a swan" was used to fan the flames of the new fire (Williams 1930, 111). Swan wings were also tied on top of poles that marked the graves of women and the pole was also decorated with white feathers, although it is not stated from what type of bird (Moore 1988, 49). These two accounts are rare instances where mention of a swan wing was made in the ethnohistoric literature survey. However, Wilma Mankiller, former principal chief of the Cherokee Nation in Oklahoma, is portrayed holding a swan wing as a clan emblem in a painting entitled *She Speaks for Her Clan* by Cherokee artist Dorothy Sullivan (n.d.).

Woodpeckers

The Ivory-billed woodpecker tarsometatarsal found in Mound 34 is a rare find. It is the only occurrence of a woodpecker remain recorded from Cahokia and, according to Parmalee (1958), places this bird 120 miles north of its former range. The best known representation of woodpeckers in the American Bottom area is the Ramey tablet (Fig. 1.5). This small sandstone tablet similar in size to the "Birdman" tablet is engraved with ivory-billed woodpeckers or possibly pileated woodpeckers (*Dryocopus pileatus*) on one side and severed human heads on the other. It dates from the Moorehead or Sand Prairie phase (Brown and Kelly 2000) and was found on the Ramey Tract in the late 19th century (Emerson 1982, Peet 1891). Similar woodpecker representations occur elsewhere as SECC motifs and may represent war. The severed heads on the Ramey tablet would reinforce this interpretation.

Historically ivory-billed woodpecker "scalps" were used by some American Indians, such as the Ponca, for peace pipe decorations or in headdresses. On an Osage turban headdress Ivory-billed woodpecker beaks are found projecting outward from a piece of swan skin. Bailey and Swan (2004, 200) refer to the ivory-billed woodpecker as "a bird that inspires great courage through its strength, endurance, tenacity, and speed."

The Osage Peace Ceremony was performed to maintain friendship between unrelated tribes as well as different segments of the Osage tribe. Pipes made in this ceremony used the skins of two pileated or ivory-billed woodpeckers, the tail feathers of the golden eagle, and owl feathers. The red on the head of a pileated woodpecker symbolized persistency and perseverance for the Osage. The skin of the head with the upper bill attached was also put on pipe stems of the Omaha, Osage, and Pawnee (La Flesche 1939).

The red-bellied woodpecker (*Melanerpes carolinus*) symbolized war for the Cherokee, possibly because the red on the back of its head gives the appearance of it having been scalped. These woodpeckers were also perceived as being swift and cunning (Hudson 1976), attributes that would be valuable to warriors. For the Creek woodpeckers were omens of impending war, rain, approaching danger, or death (Grantham 2002).

Owls

The five owl species present in the Mound 34 and Ramey Tract area are noteworthy because owl remains commonly are not found at American Bottom sites. At Cahokia, only one of the five owl species, the barred owl (*Strix varia*), has been identified outside the Mound 34/Ramey Tract area: from a context on the first terrace of Monks Mound (Parmalee n.d.). Twelve owl remains representing 2 owl species, great horned owl and barred owl, were identified by Parmalee (1957, 1958) from Mound 34. All are wing bones, except for one leg bone.

Mississippian owl representations occur primarily on ceramic vessels as adornos (Kelly and Koldehoff 1995) or as effigy pots (Milner 1983), but there may be some owl effigy pipes (Emerson 1982). Many from known contexts are associated with burials (Aftandilian 2003). The American Bottom Mississippian owl representations date primarily to the last phase of Mississippian occupation, the Sand Prairie phase, AD 1275–1375.

Southeast American Indians viewed the owl as an anomalous animal because it does not look or act-like a "normal" bird (Hudson 1976). In reviewing the ethnohistoric literature, it appears the meaning or symbolism of the owl is many times anomalous as well. At times it has a negative, foreboding connotation and at others a more positive connotation by which owls can help bring about peace and good-will (Wilson 1950).

The negative meanings that owls may convey include a somewhat universal belief among American Indian groups that owls warn of death or can cause death (Wilson 1950). For instance, the long-eared owl in particular was considered an ill omen by Southeastern tribes and may be a witch in disguise (Hudson 1976). For the Creek, witches could take the form of the great horned owl and in this form could steal and eat the hearts of its victims (Grantham 2002). The Choctaw believe the horned owl prowls at night, killing men and animals. When the horned owl was heard screeching it meant sudden death. If a screech owl was heard it was an omen that a family member under age seven would die (Swanton 1993). As mentioned above owl feathers placed on an Osage war standard represented death and destruction (Bailey and Swan 2004). Dhegiha speaking tribes to the west considered owls to be night war fighters and connected to the lower world (La Flesche 1939).

The more positive connotations for owls involve using its potentially dark powers advantageously. If the owl's powers were used properly they would be of most benefit to medicine men and warriors (Wilson 1950). Because owls can see in the darkness and discern danger, they are able to keep a watchful eye on enemies. The Menominee included owls and owl skins in their bundles to help protect the bundle's owner (Wilson 1950). In the Omaha and Ponca peace ceremonies songs were performed and owl feathers were put on the peace pipe to help promote peace and goodwill between different groups (Fletcher and La Flesche 1972). Woodpecker feathers were also used on the Ponca peace pipes for the same reason because they saw these two birds as "offering their aid" (Fletcher and La Flesche 1972, 47). Among the Mandan and Hidatsa the grey owl was believed to be a soothsayer and was kept as a live animal in their lodges (Wilson 1950). For other tribes such as the Pawnee, owls seem to be associated with children and are a source of power to help them (Wilson 1950). An owl effigy bowl found at the American Bottom Sand Prairie phase cemetery of East St. Louis Stone Quarry was associated with an infant burial (Milner 1983).

Hawks and Eagles

The large number of diurnal raptors present may hold the most significance for the Mound 34 fauna. Six species of hawk and two of eagle were identified from 54 bones. The species of hawks identified from 23 specimens include: swallow-tail kite, cooper's, red-tailed, red-shouldered, rough-legged, and kestrel. Nineteen of the 23 specimens are wing bones and four are leg bones. In addition to a tarsometatarsus and a carpometacarpus identified as golden eagle remains, Parmalee (1957, 1958) also identified 29 bald eagle bones from Mound 34. Of these, 25 are carpometacarpi from at least 16 individuals. The other bones are a cranium, tarsometatarsus, and two phalanges. A small number of hawk and bald eagle bones have been found in other areas of Cahokia such as the examples in sub-Mound 51, in the Powell Mound (Baker 1941), Interpretative Center Tract (Kelly 1991, 1997), Tract 15A (Parmalee n.d.), and on the first terrace on Monks Mound (Parmalee n.d.). Clearly, however, the occurrence of hawk and eagle bones is concentrated in Mound 34.

Perhaps the most unique species among the hawk and eagle taxa is the swallow-tailed kite. A complete femur and tibiotarsus were recovered from Mound 34 (Parmalee 1958). Parmalee (1958) notes this species may have been common throughout the state of Illinois, but there have been no records of it since 1906. *The Sibley Guide to Birds* (Sibley 2000, 111) indicates the swallow-tailed kite is primarily a southern species with its range being chiefly along the Gulf of Mexico coast with rare occurrences to the north.

Fletcher and La Flesche (1972) illustrate a "mummified" swallow-tail kite that was included in an Omaha Sacred War Pack. They indicate, "This bird is lined with cloth, native weaving of nettle-weed fiber. Several strands of native thread are fastened to the tail and a scalp lock is tied to the right leg" (Fletcher and La Flesche 1972, 413, Fig. 94). A falcon and a swallow-tail hawk were also part of this War Pack. Hawks were considered day war fighters by Dhegiha speakers and were associated with the upper world and sun and often battled the lower world owls (La Flesche 1939). Native Americans were always trying to achieve a balance in their World View, and finding owls (night) and hawks (day) together may be an example of an attempt to maintain such a balance.

Eagles and hawks are birds most commonly associated with ritual in the Mississippian Period because of their representations in its iconography. This is true more for hawks and falcons than for eagles. For Southeastern American Indian groups the eagle epitomizes the Upper World in their layered cosmology and is considered the grandfather of the falcon (Hudson 1976). The falcon, however, seems to play a more important role in their world view and iconography. In fact, "the falcon is one of the most conspicuous images in Mississippian Period iconography... Images of this bird have given rise to more interpretative interest than perhaps any other" (Brown 2007, 56).

In Osage world view, the golden eagle brought their people down from the sky at the beginning of creation (Bailey and Swan 2004). Eagles were a life symbol for Osage warriors. The Pawnee believe the eagle represents Heaven during creation (Weltfish 1965). The feathers of the immature golden eagle were used on pipes made as part of the Osage Peace Ceremony (La Flesche 1939).

In Creek society, eagle feathers were a war emblem. A single eagle had the value of 200 deer skins. A person who killed an eagle was honored with a title just as if he had taken the scalp of an enemy (Swanton 2000).

For Siouan and Caddo speakers the hawk is associated with the Morning Star deity who represents the capacity of rebirth, controls the generation of human life, and was the father of first man (Brown 2004, Murie 1981). The hawk or falcon for the Osage "is simultaneously an avatar of warriors in combat and an object for supplication, not merely to ensure success or failure on the field of battle, but more essentially to ensure a lengthy life, a healthy family, and a long line of descendants" (Brown 2007, 56).

The hawk was chosen by the Osage to symbolize courage and the combative nature of the warrior. Although the courage of hawks and eagles was considered to be equal, the hawk's swiftness and decisive manner made it more admired by the warrior (La Flesche 1921). The hawk was the life symbol for the Men of Mystery clan. A hawk skin was the most sacred object in a clan bundle, which is sometimes referred to as the "hawk bundle" or "hawk". In battle the leader of the war party carried a clan bundle (Bailey 1995, 50). When an attack was about to be made by a war party, the Sacred Warrior of the party put a hawk on the back of each of his eight commanders and then gave the signal to attack (Bailey 1995, 134), however La Flesche (1939) implies elsewhere that a single hawk was taken from the bundle and was placed on the back of the chief commander.

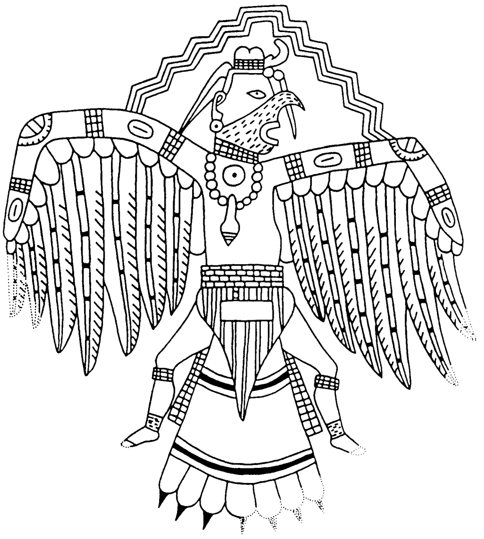

Figure 1.6. Falcon dancer portrayed on an engraved shell cup from the Spiro site, Oklahoma (from Phillips and Brown, 1975, fig. 179 with permission of Peabody Museum Press).

Because falconoid traits are incorporated into birdman images that are so prevalent in late Mississippian iconography (Fig. 1.6) and have been associated with warrior symbolism, it does not necessarily mean that Mississippian peoples became more war-like. The quote by The Reverend William Vaill, an early missionary to the Osage, in Bailey (1995, 220) that states "the Osages are remarkable for always being at war, without being a war-like people" may also epitomize the nature of Late Mississippian peoples in the mid-continent.

Summary

Five taxa of birds (swans, woodpeckers, hawks, eagles, and owls) found at the Cahokia site have been investigated for possible ritual significance. Swans are emphasized more than the other four since their ritual significance is rarely reflected in Mississippian iconography. From the brief perusal of the ethnographic and ethnohistoric accounts of how these different birds were used and viewed within American Indian groups in the mid-continent and southeast, it is apparent that the meaning or symbolism of a bird is not straightforward, but is very complex. One must understand the nature of these American Indian societies and understand the organization of their world views. Much of the symbolism involved depends on the context in which an animal is used and that symbolism can change dramatically if elements are changed within a ritual or ceremony. For example, within the Osage's world view all natural phenomena including birds "was given a set of symbolic meanings and purposes based on its known physical and behavioral qualities" (Bailey and Swan 2004, ix). Each new object they would make had its own meaning and purpose, depending on which elements were used. Some objects were for domestic use while others were for ritual use, but all were considered sacred and their production was a religious act (Bailey and Snow 2004). If this is true for most American Indian groups, then we may never be able to decipher from one element of an object its meaning or what the symbolism of the object might have been. Then, the question becomes, why should we even try?

When trying to understand the meaning of certain animal remains at a site by studying potential ethnohistoric analogs for those meanings, we may not be able to decipher specific symbols or symbolism, but we can still gain a great deal of knowledge about the organization of societies and the incredibly complex roles animals had within them, besides providing sustenance. And, we may be able to decipher much broader patterns of use for specific animals.

In the case of the swans from Cahokian contexts, it is assumed the meanings they conveyed may differ from the early sub-Mound 51 ritual feasting context to the later Mound 34 ritual activity context. The ethnohistoric literature suggests a number of possibilities for their symbolic meaning. For instance, the swan's white color is representative of purity and peace and their black beak and feet of war and death. An association with fire is another theme. The swan's connection with fertility seen in the Osage, Pawnee, and Chickasaw groups may be particularly applicable to the sub-Mound 51 context. Fertility symbolism is especially prevalent in the late Emergent Mississippian and the early Mississippian phases of Cahokia, and a fertility theme may be found in sub-Mound 51 if the large communal feasts represented by the pit's refuse were connected with harvest or renewal ceremonies.

War symbolism more prevalent after AD 1200 at Cahokia can be seen in the materials recovered from Mound 34. Swans were found in abundance here also, but swans are symbolic of both war and peace, depending upon the context in which they are used. The other four bird taxa of woodpecker, owl, eagle, and hawk, concentrated in the Mound 34 area all may have strong connections to death and warfare. During the Stirling and Moorehead phases there is a shift in Mississippian iconography from earth-mother-goddess fertility symbols to warrior symbols. These warrior symbols include depictions of falcon elements such as the forked eye, falcon tail and wing designs on Ramey Incised ceramics (Pauketat and Emerson 1991) that appear in the Stirling phase (AD 1100–1200), and birdmen and falcon dancers in the Moorehead and Sand Prairie phases (AD 1200–1350). If Brown and Kelly (2000; Brown 2004, 2007) are correct that the seeds of the SECC can be found at Cahokia in the earlier Lohmann and Stirling phases, it may be that warrior symbolism portrayed later in SECC iconography is being manifested by animals found at Mound 34 (Kelly *et al.* 2007). But the underlying message or theme for the falcon representations in the SECC is not focused simply on warfare and death, but carries a deeper allegorical meaning for life over death, for a regeneration of life, and for the social and physical perpetuation of the people (Brown 2007). The meaning does not differ significantly from the symbolism of the earth-mother goddess representations. However, the allegory which is represented in a much more complex fashion may convey the message that the society is now organized in a different and perhaps a more complex manner.

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2. The Organization of Animal Production in an Early Urban Center: The Zooarchaeological Evidence from Early Bronze Age Titriş Höyük, Southeast Turkey

Adam Allentuck and Haskel J. Greenfield

Recently, large non-elite areas of an early urban settlement have been excavated and the zooarchaeological remains systematically collected. These remains were studied in order to address several questions pertaining to the animal economy of an urban settlement. How was subsistence of an early urban society spatially organized? What was the nature of economic relations between different sectors of society? To what degree was production specialized and/or centralized? The answers to these questions are of central importance, but are largely unknown for the Early Bronze Age, the period of urban origins and early florescence in northern Mesopotamia. Zooarchaeological data from domestic herd taxa from the EBA site of Titriş Höyük, an urban regional center in SE Turkey, are used to determine the mode of animal production and consumption, productive specialization, product distribution, and differential access to animal products. The results suggest that a limited range of domestic taxa provisioned the city. Sheep, goats and cattle were of primary importance. Each was exploited for different purposes: sheep and cattle primarily for their meat and/or milk, and goats primarily for their hair. Pigs played almost no role in the economy. Low frequencies of wild animals reflect their minimal importance in the subsistence economy. Comparison of data between neighbourhoods demonstrates that there is little evidence for social inequality between neighbourhoods with respect to animal remains. (i.e. taxa, age, and body parts). Domestic stock was not preferentially provisioned to consumers according to the neighbourhood in which they lived.

Keywords: Near East, Early Bronze Age, Pastoral management, Urbanization

Introduction

The literature concerning the origins and development of complex and urban society commonly ignores or minimizes the relationship between human inhabitants of cities and the animals they depend upon for food. Yet there is a growing literature on the role of animals in early urbanized complex societies of the Near East (Atici 2005; Wattenmaker 1998; Weber 2006; Zeder 1991). Cities, towns and villages in complex societies require large and continuous quantities of food to be produced from their territory and hinterland. Early complex societies are characterized by specialized economies, in which the exploitation of domestic and wild animals is a vital component in a complex system of production and distribution. (*e.g.* Bökönyi 1978; Bökönyi and Flannery 1969; Hesse and Perkins 1974; Mudar 1982; Stein 1987; Zeder 1991). As a result, control of this territory is necessary in order to feed, clothe, and service urban populations. Some effort has been made to understand the bureaucracies that evolved to control the flow of goods from pastures to urban markets (O'Connor 2000, 160–161).

As yet, we know relatively little about the nature of livestock management and food distribution systems in early urban society. How was subsistence of an early urban society spatially organized? What was the nature of economic relations between different sectors of society? To what degree was production specialized and/or centralized? The answers to these questions are of central importance, but are largely unknown for the period of urban origins and early florescence in northern Mesopotamia – the Early Bronze Age (EBA) (ca. 3200–2000 BC).

The zooarchaeological data from the EBA site of Titriş Höyük, an urban regional center in southeastern Turkey, are used to determine the mode of animal production and consumption, productive specialization, product distribution, and differential access to animal products. Two of the areas were chosen for large-scale excavation in order to increase

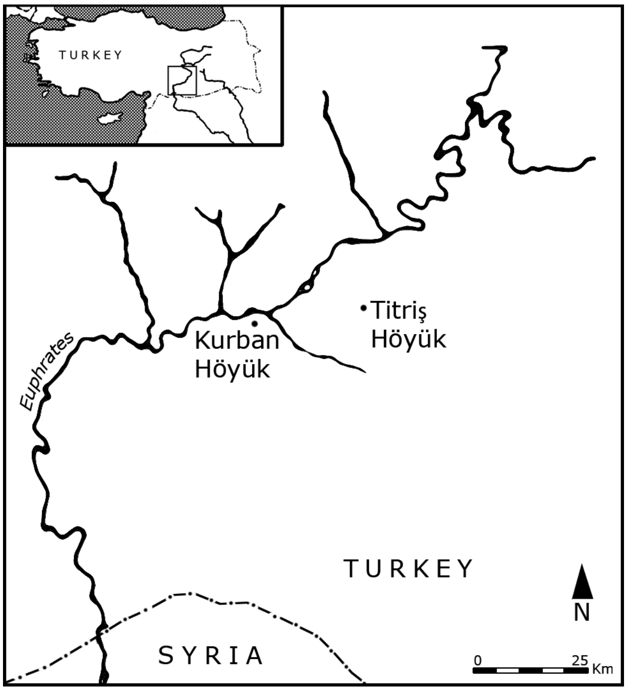


Figure 2.1. Map of region showing location of some sites mentioned in the text (prepared by V. Woollcott).

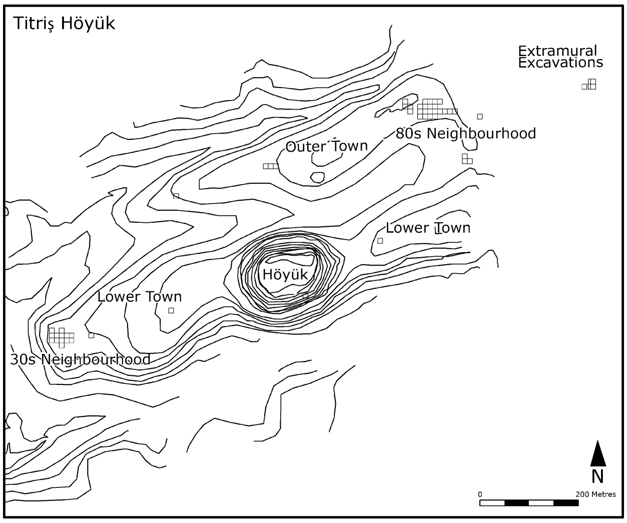


Figure 2.2. Topographic plan of Titriş Höyük showing locations of excavated trenches (adapted from Algaze et al. *(2001) and prepared by V. Woollcott).*

our understanding of non-elite neighbourhood lifestyles. This paper will investigate non-elite household life in two parts of the city by comparing the zooarchaeological remains from the two neighbourhoods.

The site

Titriş Höyük is located on a tributary of the Euphrates River within the Karababa basin. It is situated 45 km north of the modern city of Şanliurfa (Urfa), Turkey, the provincial capital of the same name (Fig. 2.1). The main period of occupation at Titriş Höyük was for only short time, during the middle (ca. 2700–2400 BC) and late (ca. 2400/2300–2200/2100 BC) phases of the EBA. During this period, it served as a small urban center and regional capital.

The site was surveyed and excavated by a team led by Guillermo Algaze (University of California – San Diego) and Timothy Matney (University of Akron) with the goal of exposing large horizontal expanses from different spatial contexts. In particular, the site was excavated to expose extensive portions of non-elite domestic and productive components of an early urban settlement. The höyük at the city's center, which contained the remains of elite and administrative architecture, was not excavated.

The site is composed of a central höyük or mound (3 ha) and an extensive lower city (35 ha), which is divided into a Lower and Outer Town (Fig. 2.2). The large block excavation of the Lower Town is known as the 30s neighbourhood, while that of the Outer Town is the 80s neighbourhood. The excavators postulated that the Lower Town was probably of higher status than the Outer Town because it contained more massive architecture and was resilient to an occupational hiatus that occurred between the middle and late EBA (Algaze *et al.* 1995, 38). Other support for this position includes the Lower Town's wider streets and greater proximity to the central höyük.

Titriş Höyük controlled the natural lines of communication on the Tavuk Çay, a tributary of the Euphrates. It was an ideal conduit for the movement of agricultural products to and from the center. A network of roads that led to Titriş Höyük was built to facilitate overland trade (Pournelle 2001). The city depended on towns and villages to the north since its immediate hinterland alone could not have fulfilled its agricultural and pastoral requirements (Wilkinson 1994, 504). Furthermore, agricultural yields would have been stressed in this period of increasing climatic aridity. Forests around Titriş Höyük and Kurban Höyük were cleared in favour of more agricultural fields and grazing lands. At Titriş Höyük, population density was at its height during the middle-late EBA (Wilkinson 1990, 99). Suburban expansion and the erection of a massive defensive wall occurred during this period, perhaps as a response to increased demand for agricultural and pastoral production (Algaze *et al.* 2001).

Titriş Höyük is unique among EBA sites of the Near East. EBA horizons at most sites are generally buried deeply below subsequent occupations, and consequently rarely are able to be investigated by broad horizontal exposures. At Titriş Höyük, at least 60 percent of middle-late EBA levels are located immediately below the surface (Matney and Algaze 1995). The single occupation of the site combined with the broad scale investigation employed in the excavation yielded a unique zooarchaeological assemblage for investigating the complexity of early urban society. Apart from this assemblage, there is a dearth of EBA zooarchaeological samples that are spatially contextualized in order to investigate differences in neighbourhood behaviour.

The sample

A very large assemblage of remains was collected during excavation. Only those that could be assigned with confidence to the EBA occupation were chosen for analysis (n=22,177). In this section, the basic data from the domestic taxa are described. For this analysis, all of the EBA material is treated as contemporary. It may become possible in the future to separate the material into sub-phases of the middle-late EBA. However, at the time of writing the stratigraphic analysis of remains was in progress. Of the excavated sample about 25 percent (n=5444) were identified to a relatively fine taxonomic level, a threshold defined as minimally recorded to a taxonomic family (*e.g.*, Bovidae). This rate of identification is low when compared to other assemblages from the region due to our mandate of recording every fragment regardless size or source of fragmentation. The 'unidentified' remains were identified to grosser taxonomic categories (*e.g.*, class, order or animal size-class).

All primary deposits were dry-sieved, with variable sieving of secondary deposits, and no sieving of tertiary deposits. For the most part, no osteological remains from tertiary deposits are included in this analysis.

Domestic animal taxa

The vast majority of identified remains are from domestic animals (n=4846; 89%). Few wild animal specimens were represented in the assemblage (n=598; 11%), which reflects an overwhelming pastorally-focused animal economy.

Caprinae

Caprinae is the taxonomic subfamily that includes domestic *Ovis aries* (sheep), *Capra hircus* (goats) and indeterminate *Ovis/Capra* (sheep or goats). Sheep and goats commonly are considered together under the non-taxonomic category of *Ovis/Capra* in zooarchaeological research because of the difficulty of consistently distinguishing their osteological remains. However, they need to be discussed separately as much as possible since sheep and goats have different properties in terms of ethology, ecological resilience, and productive capacity. Sheep are a higher energy commodity than goats; they have higher meat yields and they produce more wool (per capita) than goats produce hair. Goats have a higher reproductive rate than sheep and are better adapted to poor environments (Redding 1981, 110–111; 201). Sheep and goats have similar herding costs and both species can be herded in a single flock (Redding 1984).

A total NISP (Number of Identified Specimens) of 3292 (MNE/Minimum Number of Elements=152) Caprinae specimens are identified. Of these, 329 are specifically identified as *Capra hircus* and 484 are identified as *Ovis aries* – a ratio of 1:1.5. The remaining fragments (n=2479) are identified only as *Ovis/Capra*.

Mesopotamian textual evidence sheds light on the significance of these frequencies. Several Old Babylonian (early 2nd millennium) texts were contracts between sheep owners and shepherds, and describe the compositions of the flocks. These documents show that flock composition varied from 4 to over 200 animals. Some flocks included up to 25 percent goats, while others did not have any. Ewes represent the majority of sheep, with enough males kept in order to practice mixed-products husbandry. Primary interest in sheep was for its wool, but some were kept for slaughter (Postgate and Payne 1975). Goats were mainly raised for their hair and hides (Hesse 1995, 213–214). This is attested by texts from Ur III period at Girsu, which describe as many as thirteen thousand female weavers who may have worked in the production of textiles in the vicinity of Ur (Robertson 1995, 447). The lower frequency of goats, then, is not surprising.

Bos taurus

Bos taurus (domestic cattle) specimens account for an NISP of 1390 (MNE=57). The Caprinae to cattle ratio of 2.4:1 indicates a significantly greater abundance of the former over the latter. Even though the bones of large mammals are generally more resilient to attrition and are less susceptible to negative recovery bias, the abundance of cattle is low relative to the medium-size Caprinae. Thus, cultural selection, rather than attritional taphonomic process, best explains the higher ratio of Caprinae to cattle.

Since the Chalcolithic period, cattle were used for a variety of functions – for both their primary (meat, hide, blood, etc.) and secondary products (milk, traction, transport) (Sherratt 1983). In the ancient Mesopotamian tradition, cattle were also kept close to home. In fact, they were often kept within the household courtyard (Van De Mieroop 1997, 144–145). It is common in arid environments for cattle to be reared close to or within settlements because they require fodder to supplement grazing, and greater quantities of water at more frequent intervals than sheep and goats (Dahl and Hjort 1976, 238–241). A single household, whether of elite or non-elite status, rarely kept more than a single head of cattle, depending upon the size of the household. The meat-yield value of a single head of cattle is much greater than an individual sheep or goat. A single mature modern Near Eastern cow yields approximately the same amount of meat as three to five mature sheep or three to seven mature goats (Sasson 2006, 37, Table 2.1). The small herd size of cattle was due to the facts that they are more expensive to feed as compared to sheep and goats, and their hides are not as easily processed as the wool of sheep. Insight into the Mesopotamian ideology of cattle is provided by Old Babylonian texts, which show that cattle were named, just as a family member would have been (Postgate 1992, 164). Unlike sheep and goats, their role as beasts of burden precluded those animals from eating while on the job. Due to these circumstances, they were commonly foddered with barley and reeds, as well as some grazing vegetation (Postgate 1992, 164).

Evidence for foddering and/or limited grazing in a regime of village-based herding (Abdi 2003, 400) in and around Titriş Höyük is supported by several lines of material evidence. First, geomorphological data indicate that soil erosion in the late EBA likely from overgrazing

Element portion	NISP	%	pi	Loge pi	pi Loge pi
Carpal	26	0.01656051	0.01656051	-4.10073436	-0.067910251
Femur, complete	1	0.000636943	0.000636943	-7.358830898	-0.004687153
Femur, distal	31	0.019745223	0.019745223	-3.924843694	-0.077496914
Femur, proximal	36	0.022929936	0.022929936	-3.77531196	-0.086567663
Humerus, complete	3	0.001910828	0.001910828	-6.26021861	-0.011962201
Humerus, distal	104	0.066242038	0.066242038	-2.714439999	-0.179810038
Humerus, proximal	20	0.012738854	0.012738854	-4.363098625	-0.055580874
Mandible	319	0.203184713	0.203184713	-1.593639796	-0.323803245
Metacarpus, complete	13	0.008280255	0.008280255	-4.793881541	-0.039694561
Metacarpus, distal	42	0.026751592	0.026751592	-3.62116128	-0.09687183
Metacarpus, proximal	69	0.043949045	0.043949045	-3.124724394	-0.137328652
Metatarsus, complete	4	0.002547771	0.002547771	-5.972536537	-0.015216654
Metatarsus, distal	30	0.01910828	0.01910828	-3.957633517	-0.07562357
Metatarsus, proximal	69	0.043949045	0.043949045	-3.124724394	-0.137328652
Phalanx	173	0.110191083	0.110191083	-2.205539304	-0.243030764
Radius, complete	7	0.004458599	0.004458599	-5.412920749	-0.024134042
Radius, distal	40	0.025477707	0.025477707	-3.669951444	-0.093501948
Radius, proximal	69	0.043949045	0.043949045	-3.124724394	-0.137328652
Scapula, complete	2	0.001273885	0.001273885	-6.665683718	-0.008491317
Scapula, distal	87	0.055414013	0.055414013	-2.89292278	-0.16030846
Scapula, proximal	7	0.004458599	0.004458599	-5.412920749	-0.024134042
Sesamoid	11	0.007006369	0.007006369	-4.960935626	-0.034758148
Tarsal	5	0.003184713	0.003184713	-5.749392986	-0.018310169
Tibia, complete	1	0.000636943	0.000636943	-7.358830898	-0.004687153
Tibia, distal	84	0.053503185	0.053503185	-2.928014099	-0.156658079
Tibia, proximal	43	0.027388535	0.027388535	-3.597630783	-0.098533837
Ulna, complete	1	0.000636943	0.000636943	-7.358830898	-0.004687153
Ulna, distal	8	0.005095541	0.005095541	-5.279389357	-0.026901347
Ulna, proximal	29	0.018471338	0.018471338	-3.991535068	-0.073728992
Vertebra	236	0.150318471	0.150318471	-1.894999093	-0.284853367
TOTAL	1570	1	1	**H'=**	**2.703929725**
				V'=	**0.794993475**

Table 2.1. Shannon-Wiener Information Function of element portions of Ovis/Capra.

contributed to lower water flow from the local stream (Rosen and Goldberg 1995). Second, proxy data in the form of storage vessel scatter densities in the Titriş Höyük hinterland reflect intensive agricultural practices that would have exerted pressures on even the most uncultivable land (Wilkinson 1994). Finally, remote sensing data in combination with archaeobotanical remains indicate that land use was focused on crop cultivation with particular emphasis on barley and secondarily on wheat. These data are interpreted to reflect increased crop production to meet the need for animal fodder (Pournelle 2001; Schlee 1995, 31). All of the above suggest that grazing cattle or other livestock in proximity to Titriş Höyük would have posed a threat to agricultural production, a condition that would have promoted household-based husbandry of cattle and more distant locales of pastoralism for sheep and goats.

Sus scrofa domesticus

Sus scrofa domesticus (domestic pigs) remains from Titriş Höyük are very rare, with a NISP of 12 (MNE=2). Domestic pigs only yield primary products; they cannot be milked, nor used for traction or transportation (Zeuner 1963, 270–271). Though they are of limited or no use in terms of secondary products, they provide very high meat yields and their meat provides the highest fat and caloric values of any Near Eastern domesticate (Flannery 1969, 84, Table 2.3). They have larger litters and faster growth rates than any bovid. In theory, these qualities make pigs ideal animals for specialized meat production; but in practice, they have played only a minor role in Near Eastern economies since the EBA, of which the Karababa basin is no exception.

Analysis

The previously described data are next used to assess issues of animal management. Four issues dealing with economic mode of animal exploitation, productive specialization, animal product distribution, and animal product consumption, are addressed in turn.

Production and consumption systems

Two fundamental questions relating to animal production are investigated in this section. First, were animal resources produced in and around the city or were they produced in the rural hinterland? Second, was the pastoral economy focused on certain commodities such as meat, milk or wool, or were herd animals exploited in a broad-spectrum strategy?

A central issue in studies of household economy is the degree of specialization and centralization. This issue may be addressed by examining the nature of production and distribution of animal products. In order to understand the variable distribution of animal remains across different parts of the settlement, one must first have an understanding of the means by which animals were produced. Were domestic herds raised off-site, and then shipped to Titriş Höyük, or were these herds raised within the settlement? If herds were produced on-site, were individual households raising their own animals for their own subsistence, or was animal production a specialized activity carried out by a limited number of expert herders and butchers? The overarching issue of the nature of the animal production system at Titriş Höyük must be established in order to address behavioural issues related to variable distributions of animal products.

Wapnish and Hesse (1988) have suggested three testable models for the production and consumption system based on zooarchaeological remains. In the *self-contained production/consumption model*, the community produces and consumes all of its own animal products. In the *producing economy model*, animals are produced for both local and external consumption. In the *consuming economy model*, animals are acquired from pastoral specialists, but may be supplemented by local flocks (Wapnish and Hesse 1988, 84). Each of the three models is known by signature mortality profiles for a given animal species.

Zeder (1991) found that the mode of production of animal resources was less easily measured. Much like Wapnish and Hesse (1988), Zeder found the range of species to be the best measure of animal resource production strategies, followed by age distributions, but that it is often difficult to distinguish the role of pastoral management concerns from the influence of provisioning goals (Zeder 1991, 248). As a proposed remedy, Zeder suggests that it would have been more profitable to sample occupation areas that were more likely to have had direct access to animal resources (*i.e.*, lower status areas, such as were excavated at Titriş Höyük). Her rationale is that faunal assemblages from these contexts have greater potential to yield information about production strategies because in these cases the influence or interference of the redistribution mechanism would not have been a factor (Zeder 1991, 249).

Titriş Höyük is hypothesized to have functioned as a consuming economy during the middle-late EBA, given its first-order ranking in the settlement hierarchy of the Karababa basin. This assumption is tested by analyzing the survivorship profiles generated from the sheep, goat and cattle mandible assemblages.

All of the questions addressed below involve reconstructing the age at death of the animals. Mortality data reflect the composition of a death assemblage, not the structure of the live herd. Following the research of Payne (1973), the technique for generating such profiles for sheep and goats involves analyzing the state of mandibular tooth eruption and wear. Data derived from epiphyseal fusion and horn core development are not used as data in mortality profiles because of the potential of immature, unfused bones to be underrepresented in the sample (Payne 1973, 283). Though unfused mandibular bone is fragile, the teeth of young animals are sturdier and can be used to reconstruct the lower end of the age spectrum. Another reason for the exclusion of fusion data is that a fused bone only reflects a minimum age, whereas tooth attrition is a process that continues until the death of the animal.

Mandibles and their teeth are used for the construction of mortality profiles to the exclusion of maxillae and their teeth because the former tend to be the most represented skeletal element in MNI estimates. The wear stage is identified by the extent to which the enamel has been worn to expose the dentine. Tooth eruption and wear is recorded for the third deciduous molar (m_3), the fourth pre-molar (PM_4) that replaces it and the three permanent molars (M_1, M_2, and M_3).

The tooth eruption and wear recording system initially used was the one proposed by Grant (1975). An advantage of Grant's system over Payne's is that it lends itself to a comparison of the taxa of her study: sheep (and by extension, goat), cattle and pig. However, Grant's system is designed to express age structure in a frequency diagram as a function of the number of mandibles that represent each wear stage. Furthermore, each of Grant's wear stages is weighted equally even though the later stages of attrition last longer than the early stages of eruption and attrition (Moran and O'Connor 1994). This structure can result in a dubious identification of increased mortality rate, when in fact the length of the wear stage is responsible for the peaked frequency (Hambleton 1999, 63).

By contrast, Payne's classification system was exclusively intended for the construction of mortality profiles of caprines, though this system was subsequently used to classify tooth eruption and wear of cattle (Halstead 1985). Payne's recording system expresses tooth wear in a mortality curve as a function of the percentage of the population that is alive at the end of each successive stage (Hambleton 1999, 62; Payne 1973). A particularly important quality of the Payne system is that each of the wear stages is weighted according to the duration of the particular stage. Also, the format of the mortality curve, rather than the frequency diagram, is more amenable to identification of signature profiles that reflect meat, milk and wool exploitation strategies. Simply put, Payne's means meet the ends of the present research design.

Since Payne's system is more appropriate, following the instruction of Hambleton (1999, 64–67), the data that were initially recorded in the Grant age classification system were converted to the Payne system. Subsequent to this analysis, the validity of the Grant-to-Payne conversion procedure was empirically verified by Greenfield and Arnold (2008, 843–844). Once this conversion was complete, the process of generating the mortality profile was accomplished by first summing the number of individuals in each wear stage, and then expressing each as a function of survivorship on a line graph. Following Payne (1973), mortality is expressed as a percentage of survival.

The task of assigning a calendar age to each wear stage is interpretive in nature. There is potential variation in maturation rates between breeds. Furthermore, tooth eruption and attrition rates can be dependent on unobserved factors such as environment, climate, seasonal variability in diet, and health (Moran and O'Connor 1994, 269–270), especially for an animal in its first year of life. However, recent research on sheep and goats indicates that there is much less variation than previously suspected when breeds from North America, Great Britain, and Turkey are compared (Greenfield and Arnold 2008). As a result, Greenfield and Arnold's (2008, 846, Table 6) calendar ages are used in the analysis. The standard of Halstead (1985), which derives from that of Payne (1973) for goats, is used for the analysis of cattle mortality.

The combined *Ovis/Capra* mortality histogram shows a bimodal distribution with peaks at wear stages D (1–2 years) and H (6–8 years) (Fig. 2.3). The derived survivorship curve displays these peaks as two kinks in a descending pattern (Fig. 2.3). These data indicate that about 30% of *Ovis/Capra* was slaughtered before the end of their first year; 50% before the age of four; and about 80% before the age of six. However, since it is well established that the exploitation strategies of sheep and goats can be different, the utility of these mixed data is questionable. It is entirely possible that sheep and goats were raised for different reasons, which, if true, would produce different culling patterns expressed in different survivorship curves (Greenfield 2005; Halstead 1998).

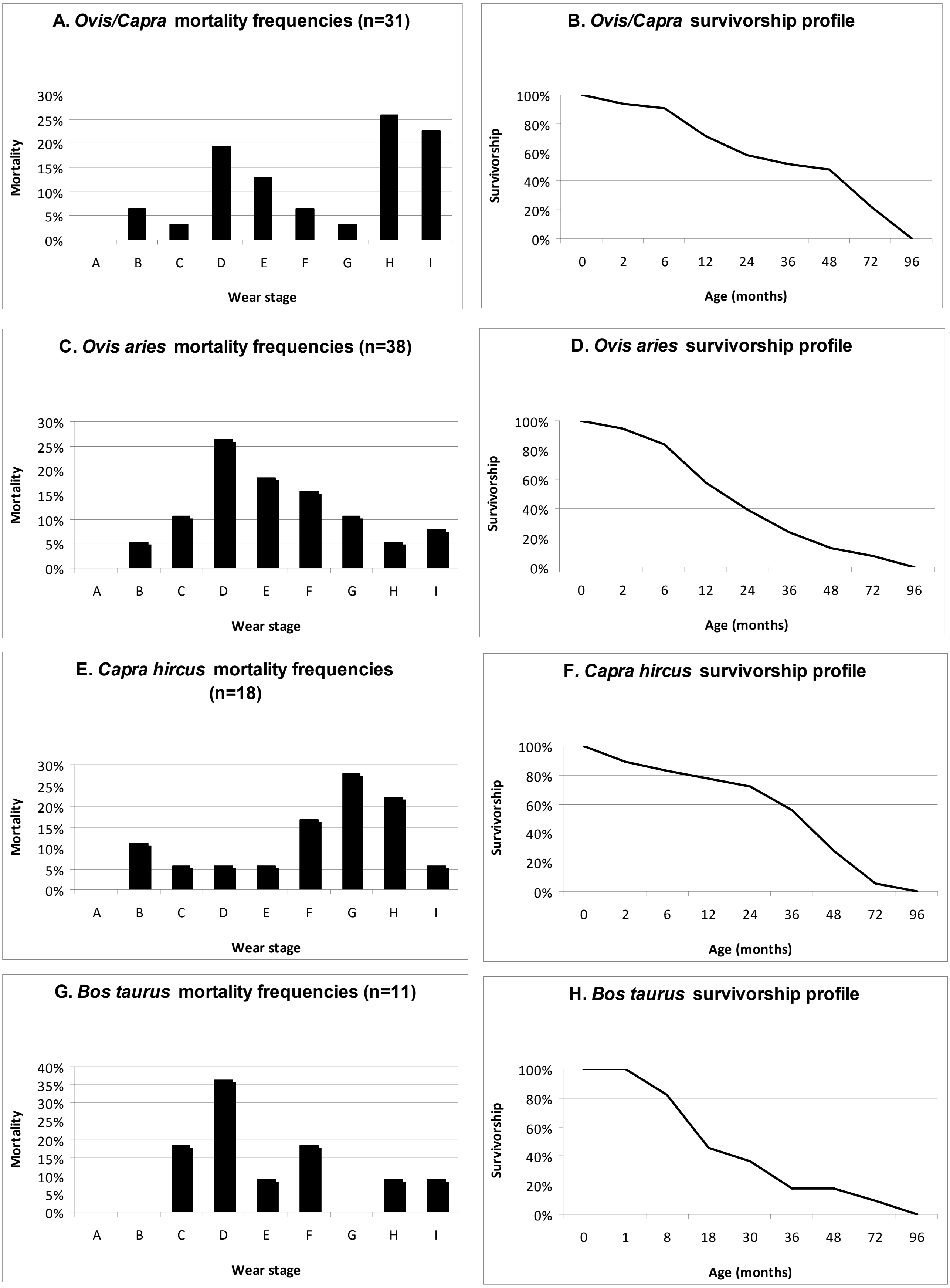
Fortunately, the mandibles and teeth of sheep and goats are readily distinguishable in many cases (Balasse and Ambrose 2005; Halstead *et al.* 2002; Payne 1985), even though Russell and Martin (2005, 65) experienced less consistent results when applying some of these criteria, especially for M_1 and M_2. Notwithstanding, reliable species distinctions allow for the culling data to be compiled separately for sheep and goats. The *Ovis aries* mortality histogram (Fig. 2.3) shows a unimodal distribution that peaks at wear stage D (1–2 years), which coincides with the definition of market age for this species (Payne 1973). The associated survivorship curve (Fig. 2.3) smoothly descends from this point onward. These data indicate that approximately 45% of *Ovis aries* were culled before the end of their first year; about 60% before their second year; 85% before the age of four; and over 90% before their sixth year of life.

The *Capra hircus* mortality histogram also displays a unimodal distribution, which peaks at wear stage G (4–6 years), a point that marks the end of the reproductive capacity of this species (Fig. 2.3). Its survivorship curve abruptly kinks at the beginning of wear stage F, and then again at the start of wear stage I (Fig. 2.3). These two points frame the culling emphasis that occurs in the second half of the scale. The data show that about 20% were slaughtered before the end of their first year; about 30% before their second birthday; about 45% before their third year of life; about 70% before the age of four; and over 95% before the age of six. Despite the small size of this particular sample (n=18), the data suggest that most of the goats were culled later in life than sheep.

The *Bos taurus* mortality data suffer from an even smaller sample size (n=11). This mostly unimodal pattern peaks at wear stage D (1.5–2.5 years), equivalent to the market age of cattle (Fig. 2.3). Its derived survivorship curve is not smooth, reflecting abruptly changing values between successive wear stages (Fig. 2.3). The data indicate that about 20% were harvested before the first 18 months of life; about 55% before they reached 30 months of age; about 80% before young adulthood; and approximately 90% before they reached senility. These results must be regarded with caution since they were gathered from a very small sample of mandibles.

The question remains: did Titriş Höyük's economy serve itself, did it serve to provision other communities, or did other communities provision Titriş Höyük? Unfortunately, this line of evidence alone does not clearly point to any one of these modes of production. Within any given animal category, at least one age group is emphasized. Put together, all of the important age categories are represented. Market age sheep and cattle are strongly represented, as are reproductive age goats. Given this scenario, sheep and cattle could have been produced for their meat, while goats could have been produced for their secondary products, at least until they were too old. Considering the above data distributions, it is likely that any of the three possible modes of production (self-sustaining, consuming, or producing) could have been feasible given the diverse age structures of the herd animals.

The picture becomes clearer by incorporating diversity measures of element portion representation into the equation (Tables 2.1–2.2). Following the terminology of Kintigh (1989), two components of diversity are richness (the number of categories) and evenness (the relative abundance of those categories). These measures are calculated with the Shannon-Wiener Information Function, for which its formula is described in the footnote of Table 2.3. The richness values of Caprinae and cattle are both very high (H'=2.70 and 2.73, respectively) – *i.e.*, the number of represented element portions is high for both animal categories. Furthermore, the evenness scores for Caprinae and cattle are also high (V'=0.79 and 0.87, respectively). The fact that all of the skeletal elements of these animals are fairly evenly represented indicates that either animals were brought to Titriş Höyük on the hoof and then butchered or were raised and butchered at the site in the self-sustaining or producing economic mode. The even representation of all elements precludes the possibility that Titriş Höyük was a consumer site in which selective



A. ***Ovis/Capra*** **mortality frequencies (n=31)**

B. ***Ovis/Capra*** **survivorship profile**

C. ***Ovis aries*** **mortality frequencies (n=38)**

D. ***Ovis aries*** **survivorship profile**

E. ***Capra hircus*** **mortality frequencies (n=18)**

F. ***Capra hircus*** **survivorship profile**

G. ***Bos taurus*** **mortality frequencies (n=11)**

H. ***Bos taurus*** **survivorship profile**

Figure 2.3. Age at death of caprines and cattle based on mandibular tooth eruption and wear data (caprines: A=0–2 mo.; B=2–6 mo.; C=6–12 mo.; D=12–24 mo.; E=24–36 mo.; F=36–48 mo.; G=48–72 mo.; H=72–96 mo; I=96–120 mo. (after Payne 1973; Greenfield and Arnold 2008, 846, table 6). Bos taurus*: A=0–1 mo.; B=1–8 mo.; C=8–18 mo.; D=18–30 mo.; E=30–36 mo; F=young adult; G=adult; H=old adult; I=senile) (after Halstead 1985).*

Element portion	NISP	%	pi	Loge pi	pi Loge pi
Carpal	24	0.0292326	0.0292326	-3.5324693	-0.1032634
Femur, complete	1	0.001218	0.001218	-6.7105231	-0.0081736
Femur, distal	26	0.0316687	0.0316687	-3.4524266	-0.1093339
Femur, proximal	10	0.0121803	0.0121803	-4.407938	-0.0536899
Humerus, complete	1	0.001218	0.001218	-6.7105231	-0.0081736
Humerus, distal	56	0.0682095	0.0682095	-2.6851714	-0.1831542
Humerus, proximal	13	0.0158343	0.0158343	-4.1455738	-0.0656425
Mandible	95	0.1157125	0.1157125	-2.1566462	-0.249551
Metacarpus, distal	29	0.0353228	0.0353228	-3.3432273	-0.1180921
Metacarpus, proximal	35	0.0426309	0.0426309	-3.155175	-0.1345081
Metatarsus, distal	27	0.0328867	0.0328867	-3.4146862	-0.1122978
Metatarsus, proximal	40	0.0487211	0.0487211	-3.0216437	-0.1472177
Phalanx	148	0.180268	0.180268	-1.7133108	-0.3088551
Radius, distal	24	0.0292326	0.0292326	-3.5324693	-0.1032634
Radius, proximal	35	0.0426309	0.0426309	-3.155175	-0.1345081
Scapula, distal	37	0.045067	0.045067	-3.0996052	-0.1396899
Scapula, proximal	5	0.0060901	0.0060901	-5.1010852	-0.0310663
Tarsal	15	0.0182704	0.0182704	-4.0024729	-0.0731268
Tibia, distal	29	0.0353228	0.0353228	-3.3432273	-0.1180921
Tibia, proximal	28	0.0341048	0.0341048	-3.3783186	-0.1152167
Ulna, distal	6	0.0073082	0.0073082	-4.9187636	-0.0359471
Ulna, proximal	22	0.0267966	0.0267966	-3.6194807	-0.0969897
Vertebra	115	0.1400731	0.1400731	-1.965591	-0.2753264
TOTAL	821	1	1	**H'=**	**2.7251792**

Table 2.2. Shannon-Wiener Information Function of element portions of Bos taurus.

animal parts were supplied from outside pastoral specialists or from a supplier site.

Productive specialization

An important issue in studies of pastoral economies is the emphasis of production (Greenfield 1988; Payne 1973; Sherratt 1983). Was the focus of production on primary products (meat), or was it on secondary products (milk, wool, transportation, traction)? An examination of this issue not only has economic implications, but also dietary and technological implications.

Domestic livestock are raised for a variety of products, the combination of which is dependent upon productive strategy. Some time during or after the Neolithic period, pastoralists in the Near East began to exploit secondary products, such as milk, wool, traction, transportation and dung, in addition to the primary products of meat, hide, sinew and bone. By the EBA, pastoralists were specializing in the production of one or more products.

In order to assess the issue of productive specialization, the data are compared to the basic models of animal exploitation under conditions of productive specialization, originally proposed by Payne (1973). They are as follows. In a meat producing economy most male livestock will be culled before they reach maturity, but when they have achieved optimal weight gain. A small fraction of the male herd will be kept for reproduction. Most female livestock will be culled during adulthood when their reproductive capacity dwindles. When milk is the productive emphasis, herders will keep a large supply of lactating adult females. Male livestock are less predictable in this model. If wool or hair production is the primary objective of the herder, then male and female livestock will generally be harvested in adulthood (*e.g.* Davis 1984; Greenfield 1988, 2005; Redding 1981).

As was mentioned in the previous section, about 60% of sheep were culled before the age of two (Figs. 2.3c and d). Sheep reach their optimal weight gain between 1.5 and 2.5 years of age, which is the ideal point at which to cull them if meat is the desired product. Thus, according to Payne's (1973) model, the kill-off pattern of sheep suggests a pastoral strategy primarily focused on meat production. However, female sheep that are reared in a meat exploitation strategy can be milked without any consequence for meat yields or herd structure (Greenfield 1988, 576). Given that the median of the *Ovis aries* distribution falls on the sub-adult age class (wear stage D), and that the second-most frequently occurring value in the array is the young-adult age class (wear stage E), the data hint to a mixed meat and milk exploitation strategy with respect to sheep.

The culling pattern for goats (Figs. 2.3e and 2.3f) shows

Taxon	Common name	NISP	%	pi	Loge pi	pi Loge pi
Bos primigenius	auroch	6	0.13%	0.0012648	-6.672876	-0.00844
Bos taurus	cattle	1362	28.71%	0.2870995	-1.247926	-0.358279
Capra aegagrus	bezoar goat	1	0.02%	0.0002108	-8.464636	-0.001784
*Capra hircus**	goat	1317	27.76%	0.2776138	-1.281524	-0.355769
Capreolus capreolus	roe deer	15	0.32%	0.0031619	-5.756586	-0.018202
Castor fiber	beaver	1	0.02%	0.0002108	-8.464636	-0.001784
*Cervus elaphus***	red deer	33	0.70%	0.0069562	-4.968128	-0.034559
*Dama dama***	fallow deer	1	0.02%	0.0002108	-8.464636	-0.001784
Lepus sp.	hare	57	1.20%	0.0120152	-4.421585	-0.053126
Mustelidae	badger/otter/weasel	1	0.02%	0.0002108	-8.464636	-0.001784
*Ovis aries**	sheep	1937	40.83%	0.4083052	-0.895740	-0.365735
Sus scrofa	pig	13	0.27%	0.0027403	-5.899687	-0.016167
Total		4744	100.00%	1	**H' =**	**1.2174138**
					V' =	**0.4899234**

* The category of *Ovis/Capra* (sheep/goat) was eliminated for the purpose of this statistic. Specimens that were recorded as Ovis/Capra were "split" into the "Ovis aries" or "*Capra hircus*" categories based on the ratio of proper *Ovis aries* to *Capra hircus* specimens (NISP). The sheep:goat ratio is 3:2. Thus, 60 percent of the *Ovis/Capra* specimens were applied to the *Ovis aries* category and 40 percent were applied to the *Capra hircus* category.

** The category of *Cervus elaphus/Dama dama* was eliminated for the purpose of this statistic. It was split between the categories of *Cervus elaphus*, *Dama dama* and *Capreolus capreolus* in the same fasion as above. The category of *Cervidae* was eliminated for the purpose of this statistic. It was split between the categories of *Cervus elaphus*, *Dama dama*, and *Capreolus capreolus* in the same fashion as above.

Following the logic of Wattenmaker (1998, 165), dogs, equids, rodents, and carnivores were excluded from this calculation because they may not have been exploited for the purpose of consumption.

Mammals are only considered in this calculation.

Ovis/Capra redistribution		
"control"	NISP	Ratio
Capra hircus	329	0.404674
Ovis aries	484	0.595326
combined	813	1
Ovis/Capra (original) =	2441	
	Added to	NISP
OC-*Capra hircus*	987.8093481	988
OC-*Ovis aries*	1453.190652	1453

Shannon-Wiener function is calculated as H'=-Σ(pi)(Loge pi)
where: H' = information content of the sample
pi - the relative abundance of the ith taxon within the sample
Loge pi = the natural logarithm of pi.

Evenness is calculated as: V'=H'/Loge S
where: H' is the the Shanon-Wiener function
S = the number of taxonomic categories

H' is the Shannon-Wiener function (richness)
V' is the Evenness score

Table 2.3. *Shannon-Wiener Information Function of food taxa.*

a strong emphasis for culling between three and eight years of age in sharp contrast to the kill-off pattern of sheep. Only 30% of the goats were slaughtered before the age of two and 70% survived until the age of six. This pattern fits Payne's (1973, 281) specialized wool (hair, in the case of the goat) production model in which the animal is sheared until the quality of its fibres becomes poor. This loss of quality usually occurs in later adulthood (after 6 years), at which point the animal is culled. Even though, goat leather, a non-renewable or primary product, is thought to be a more useful commodity than its hair (Noddle 1994, 121), the harvest profile seems to indicate an emphasis upon secondary product exploitation. Certain breeds of goat, particularly the modern Angora goat, produce a high quality hair of great economic value. If EBA goats produced hair of a similar quality, it is understandable why they were reared for their fibres. Though the goat survivorship curve best fits Payne's fibre production model, exploitation for milk is not precluded as these two secondary products may be exploited in tandem. In fact, a mixed strategy would have served to fill seasonal scheduling around lactation periods (Dahl and Hjort 1976, 212–215), or to concurrently exploit secondary products from both male and female stock (Ryder 1993, 18). Such a scenario would be attractive if not crucial given that milk provides 79% of the annual caloric yield of modern Middle Eastern goat herds (Redding 1981, 233; Russell 1988, 29).

A general impression of the culling pattern of cattle (Figs. 2.3g and 2.3h) can be gleaned from the data, though their reliability is questionable because of a small sample size (n=11). Approximately half of the cattle deaths occurred between juvenility and sub-adulthood. This stands in contrast to the other half of the cattle deaths that are distributed more evenly over the much longer interval of adulthood. This apparent emphasis on young cattle is expected considering that they would not have been raised for their exploitable fibres, for which they have none. As was the case with the sheep data, it is difficult to identify whether these cattle were raised for the purpose of exploiting meat, milk, or both, especially in light of the data.

Distribution

The greater the state's scale of urbanization and the more consumers are removed from production, the more specialized and centralized are the distribution of its animal products (Zeder 1991, 33). This is especially true if demand for certain animal products is high. The distribution of meat and other animal products should produce a pattern of faunal assemblages at both producer and consumer sites (Crabtree 1989, 158). Previous investigations of these issues have used three zooarchaeological correlates: species diversity and ratios, age distributions, and body part distributions (Maltby 1984; O'Connor 1989; Wapnish and Hesse 1988; Zeder 1991).

Zeder initially predicted that indirect distribution of meat would be visible through restricted species diversity and selection for species that best suit the provisioners' goals. However, this measure is not successful because of the limited range of domestic species that was available to all early Near Eastern societies. Furthermore, as was mentioned earlier, Zeder (1991, 246) found it difficult to distinguish the role of animal management concerns from the influence of provisioning goals when evaluating the types of animals.

A more accurate measure of the mode of meat distribution is age distribution. Zeder predicted that indirect distribution of meat would be visible through a focus on a single age group of caprines. That age group was predicted to be the one that would provide the greatest meat yield for labour and forage investment (Zeder 1991, 247). At Tal-e Malyan, contexts with the most restricted age groups were found in specialized administrative and economic activity contexts. These were interpreted as households that engaged in indirect distribution. Broader age curves from other spatial contexts indicated direct distribution of animal resources (*i.e.*, obtained directly from the herder or produced by the household).

Zeder's third measure for the mode of distribution was the selectivity of body part distribution and standardization of butchery. In one context at Tel-e Malyan, she found a focus on medium mammal limb bones, which indicated indirect distribution. In a different context, a high representation of medium mammal cranial elements suggested that this area of the settlement was a conduit for channelling caprids into the city. At Tell Jemmeh, body part distribution data was also used for identifying differential distribution. In this case all parts of the carcass of all the major food animals (caprids, cattle and pigs) were represented in anatomically expected proportions (Wapnish and Hesse 1988, 93).

Initially, it was expected that consumers at Titriş Höyük acquired domestic animal products indirectly through specialized and centralized distribution channels rather than directly through individually self-sufficient household production. The mode of distribution is reflected in the species, parts, butchery patterns, and ages of the animals in the faunal assemblage. These proxies are used in conjunction, but are discussed in turn below.

Diversity of animal taxa is the first variable that will be used to test the hypothesis. The Shannon-Wiener Information Function (Kintigh 1989) was chosen in favour of all other similar statistics to measure diversity in order to generate results that could be compared to diversity scores from Kurban Höyük (Wattenmaker 1998), a neighbouring site in the Karababa basin. Richness (H'), the number of taxa, is a difficult measure to interpret on its own. It is most useful if compared with other richness scores. In a diachronic analysis, a common exercise is to compare richness scores from different chronological phases. In this synchronic analysis, all material is treated as a single assemblage.

Comparable diversity scores have been published from levels at Kurban Höyük that are contemporaneous with those under study (Wattenmaker 1998, 165, Table 20). The mean richness score of 2.84 from Kurban Höyük (from

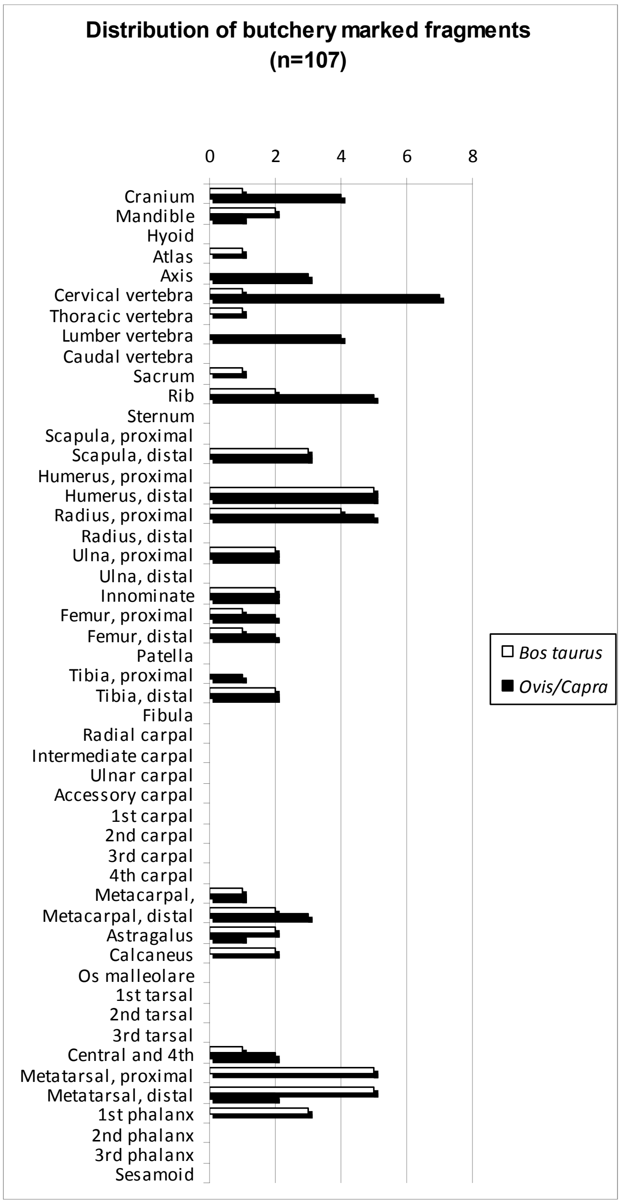


Figure 2.4. Distribution of fragments with butchering marks.

periods IV.3–IV.1) is more than twice the value of the richness score from the Titriş Höyük assemblage (H'=1.22) (Table 2.3). The low richness value suggests that relatively few animal taxa were exploited at EBA Titriş Höyük.

Evenness (V') or the relative frequency of different taxa at Titriş Höyük is measured on an interval scale of 0 to 1, and thus does not require comparative scores for interpretation (Table 2.3). The evenness score of 0.49 reflects an uneven taxonomic representation, focused mainly on the three staple domesticates – cattle, sheep and goat. Thus, both richness and evenness scores indicate low taxonomic diversity of the Titriş Höyük faunal assemblage, thus reinforcing the assertion of indirect distribution.

Next, the diversity of skeletal portions of individual taxa is an indication of the mode of distribution. If meat is distributed through indirect channels, the state's goals will likely be to provision a standard array of body portions (Tables 2.1–2.2). To reiterate, the richness (H') values of both *Bos taurus* and Caprinae are high and almost identical (2.70 and 2.73, respectively). Contrary to the above prediction, most of the element portions of the herd animals are represented. Not only are they represented, but also the evenness (V') scores of cattle and sheep/goat are high (0.79 and 0.87, respectively). Thus, the portions that were provisioned are fairly richly and evenly represented. Moreover, this line of evidence suggests that whole animals whether live or as carcasses, were provisioned to consumers, regardless of the state's involvement in animal product distribution.

A related issue is the degree of uniformity of butchery marks across the faunal assemblage. Just as one would expect the state to distribute a restricted array of body part types, one would also expect cut marks to show a restricted pattern across the assemblage if butchery and meat preparation were conducted by a limited number of skilled specialists (Crabtree 1989, 168–169). Traces of butchering were observed infrequently in the caprine and cattle faunal assemblages (n=107). This low frequency is most likely due to the ubiquitous masking of most bone surfaces by calcium carbonate. Though many other bone fragments were likely butchered, a relatively small number of them were clean enough for butchery marks to be visible. Despite this low frequency of observation, enough were observed for the data to be useful. The distribution of butchered body parts of both caprine and cattle are fairly restricted (Fig. 2.4). In both cases, only about half of the element portions are represented. This relatively limited variability in butchery marks across the assemblages suggests that butchering was a specialized activity carried out by a limited number of practitioners.

The final proxy for testing implications of animal product distribution uses age data. Following the prediction of indirect distribution, if meat distribution was controlled by a system wherein central decision-makers had influence that overrode the preferences of consumers, then one would expect uniformity in the ages of animals provisioned in this system. The unimodal age distributions of *Ovis aries* and *Capra hircus* (Figs. 2.3c and e) clearly demonstrates that most deaths tightly surround a single age (sub-adulthood and later adulthood, respectively). The few outlying values on these histograms may represent anomalous individuals. In the case of sheep, the few individuals that occupy wear stages H and I (6–10 years or mature and senile adults) may represent ewes that were culled when their reproductive potential diminished. The outlying goat deaths that occurred during juvenility may represent diseased animals that died prematurely. If these outliers are considered anomalous, the age data for both sheep and goats appears to be relatively uniform and restricted.

The age distribution of *Bos taurus* is more difficult to interpret (see Fig. 2.3). The possibility remains that these results are misleading due to the small size of the sample. This problem aside, most deaths are distributed widely between juvenility and early sub-adulthood. This may indicate that if an indirect distribution system existed, cattle were not under its control. Rather, the varied mortality pattern of cattle suggests that decisions regarding their exploitation were made at the level of the household.

In order to understand whether animal resources were distributed directly or indirectly at EBA Titriş Höyük, it is necessary to synthesize the various lines of evidence that were used in this portion of the analysis – species, parts, butchery patterns, and age. Evidence for indirect distribution comes from the following: only three domestic animal species define the assemblage, butchery marks were restricted to a limited number of bone portions, and the age distribution of caprines was focused. Evidence for direct distribution is supported by a relatively wide distribution of caprine and cattle element portions, and a broad distribution of cattle mortalities.

These two last results, however, do not necessarily have to be interpreted as evidence for direct distribution. First, the fact that all animal portions are represented implies that whole animals were provisioned, but not necessarily to individual households. If whole animals were provisioned to groups of households, and then divided among them, then all parts of those animals should be represented in the assemblage. Alternatively, even if portions were provisioned to individual households, the remains of all portions from disparate households would be expected to end up in the community garbage dumps (Zeder 1991, 41). Since it was not possible to compare the assemblages of individual households, the assemblage in this part of the analysis consists of everyone's garbage. Though all animal portions are represented, and most are well represented relative to their expected frequency, this result does not necessarily point to direct provisioning from herders to consumers.

Second, the broad distribution of cattle mortalities must be understood in the cultural context of that species. To reiterate the Mesopotamian textual evidence, cattle were commonly raised at the household level and close to the home because of their intense foddering requirements. It would have been quite common for each household to keep a single head of cattle in a courtyard or in a proper animal pen. In fact, Rainville (2001) interprets Room 12 in Building Unit 5 (Trenches 35/12 and 36/12) and Rooms 16 and 16b in Building Unit 4 (trench 81/87) at Titriş Höyük as enclosed and sheltered animal pens inside of house structures. If cattle exploitation was practiced at the discretion of the individual household, then variable culling patterns would be expected. Different households would have had different production goals, which are dependent upon idiosyncratic factors such as household size, status, and taste. With this in mind, the limited cattle age data are in line with what we know of traditional Mesopotamian cattle production.

To summarize, the various lines of evidence suggest that caprines were distributed indirectly through specialized and centralized channels, while cattle were raised and exploited at the level of the household.

Consumption

We now turn to an assessment of the exchange of animal products between producers and consumers within the settlement. A common feature of complex societies is productive specialization, for which we expect to find archaeological evidence for the allocation of food to non-food producing specialists. Consumers can acquire food through large-scale redistribution by a centralized mechanism, through market exchange, or through individual exchanges between producer and consumer. The means by which food is distributed should produce a pattern in the faunal assemblages of both producers and consumers. By examining the range of exploited species, the relative importance of the different species, slaughter patterns and age ratios of the important domestic species (Crabtree 1989, 159) between spatially discrete areas of the settlement, the nature of intra-site animal product exchange at Titriş Höyük is identified.

Two neighbourhoods within the walls of the settlement will be analyzed in a comparative approach – the 30s neighbourhood in the Lower Town and the 80s neighbourhood in the Outer Town (Rainville 2001). They not only represent contiguous trenches to the archaeologist, but they were probably also considered to be parts of neighbourhoods in antiquity. It should be noted that the samples of excavated trenches only represent portions of neighbourhoods, not entire neighbourhoods. Furthermore, trenches in the 80s neighbourhood were far more intensively excavated than the trenches in the 30s neighbourhood. This recovery procedure bias produced a much larger faunal sample in the 80s neighbourhood (NISP=3931) than in the 30s neighbourhood (NISP=578). The 30s neighbourhood is thought to have been of higher status than the 80s neighbourhood (Algaze *et al.* 1995, 38). However, Rainville (2001, 272–274) debates this assertion by arguing that architectural differences between the two neighbourhoods are negligible. Having established the parameters of this part of the analysis, the faunal assemblages from the 30s and 80s neighbourhoods are compared in order to validate either hypothesis.

It is predicted that there would be differences in wild animal exploitation between the two neighbourhoods if there were status differences between them. If lower status households need to pursue a risk minimizing strategy, then diversifying the subsistence base would be a commensurate response. A comparison of wild food taxa distributed between the 30s and 80s neighbourhoods at Titriş Höyük (Table 2.4) demonstrates that many more bones from wild food animals were found in the lower status 80s neighbourhood (n=251) than in the 30s neighbourhood (n=28). Also, a greater number of taxa are represented in the 80s neighbourhood (n=24) than in the 30s neighbourhood (n=11). Despite this apparent distinction, the previously mentioned sample size bias in favour of the 80's neighbourhood is likely the weightiest contributor to this result. Though cultural selection may have contributed to this pattern to some degree, the likelihood of recovering some of these rare taxa is much greater in the more intensively sampled 80s neighbourhood.

		30s		80s	
Taxon	Common name	NISP	%	NISP	%
Accipitridae	hawk			2	0.80%
Anseriformes	goose			1	0.40%
Antilocapridae	antelope			3	1.20%
Bivalvia	bivalve	3	10.71%	10	3.98%
Bos primigenius	auroch	2	7.14%	3	1.20%
Capra aegagrus	bezoar goat			1	0.40%
Capreolus capreolus	roe deer			14	5.58%
Castor fiber	beaver			1	0.40%
Cervidae	cervid	1	3.57%	9	3.59%
Cervus elaphus	red deer	4	14.29%	18	7.17%
Cervus elaphus/ Dama dama	red deer/fallow deer	3	10.71%		
Decapoda	crustacean			4	1.59%
Equus sp.	equid			52	20.72%
Felidae	felid	1	3.57%	2	0.80%
Felis silvestris	wild cat			2	0.80%
Gastropoda	gastropod	2	7.14%	52	20.72%
Lamniformes	shark	1	3.57%		
Lepus capensis	hare	7	25.00%	42	16.73%
Mustelidae	badger/otter/weasel			1	0.40%
Naticidae	mollusk			1	0.40%
Osteichthyes	bony fish	2	7.14%	18	7.17%
Panthera leo	lion			1	0.40%
Sus scrofa	pig			1	0.40%
Testudines	turtle			1	0.40%
Ursus sp.	bear			1	0.40%
Vulpes sp.	fox	2	7.14%	11	4.38%
TOTAL		28		251	

Note: eliminated non-food wild taxa: Aves, Canidae, *Canis lupus*, Carnivora, Lamniformes, Mammalia, *Meles meles*, *Meriones* sp., *Microtus* sp., Reptilia, and Rodentia

Table 2.4. Distribution of wild food taxa by neighbourhood.

Another approach to comparing neighbourhoods is to assess relative frequencies of each taxon per neighbourhood, particularly the wild taxa. This yields the opposite results. In many cases for which a taxon is represented in both neighbourhoods, it has a greater relative representation in the 30s neighbourhood than in the 80s neighbourhood (*i.e.*, *Bos primigenius*, *Cervus elaphus*, *Lepus capensis*, and *Vulpes* sp.). Again, this observation is likely a function of sample size bias.

A more equitable method of comparison is to examine the taxa that display the most divergent frequency values between neighbourhoods. In this case, these divergent results are often characterized as presence-absence ratios. For instance, the 80s neighbourhood yielded *Capreolus capreolus* (6%) and *Equus* sp. (21%), whereas the 30s neighbourhood did not yield either of these wild food taxa. The 30s and 80s neighbourhoods both contained remains of *Cervus elaphus*, *Lepus capensis*, and Osteichthyes, although in varying quantities.

Another way to examine differential access to resources is by the age distribution of domestic animals. Households in the purportedly higher status 30s neighbourhood were predicted to have had greater access to prime age animals for meat consumption (1–2 years for caprines) than households in the 80s neighbourhood. Of course, this assumption is only applicable to animals that were provisioned indirectly. In the previous section, it was concluded that sheep and goats were channelled indirectly to households, while cattle were raised and exploited at the household, without the state's intervention. Thus, the assumption of differential access between neighbourhoods is only relevant to animal species that were outside of the household's control – *i.e.*, sheep and goats. For this reason, the cattle age data are excluded.

The sheep and goat mandible-derived age data, though reliable, are supplemented here by bone fusion-derived age data (Fig. 2.5). The fusion data are useful for supplementing the mandibular data's deficiency of under-representing early mortalities.

It is clear from comparison of the bone fusion data for

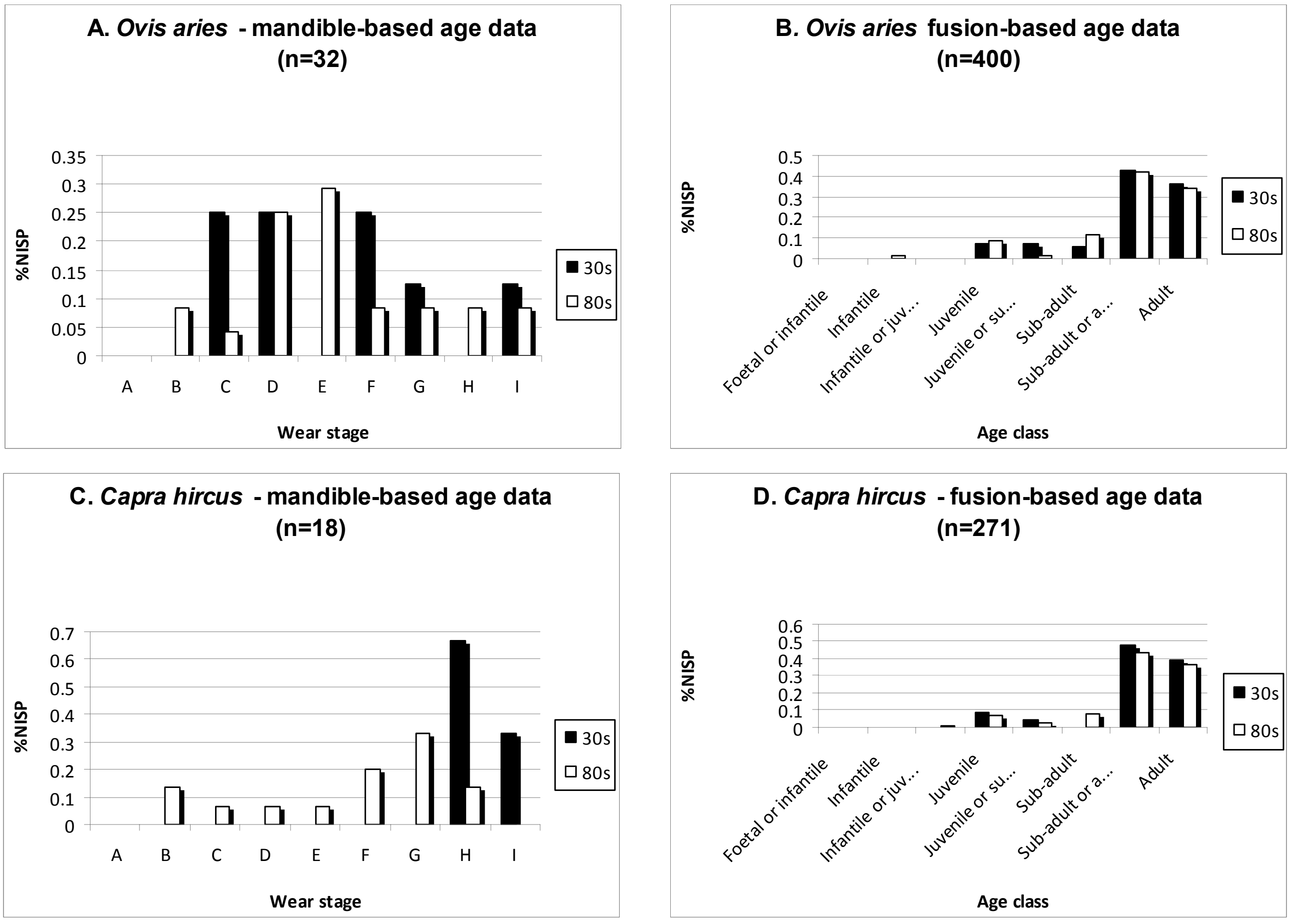


Figure 2.5. Mandible and epiphyseal fusion age data by neighbourhood. (a) 30s: n=8, 80s: n= 24; (b) 30s: n=66, 80s= 334; (c) 30s: n=3, 80s: n=15; (d) 30s: n=23, 80s: n=248.

sheep and goat (Figs. 2.5b and d) that both neighbourhood assemblages demonstrate strikingly similar age distributions. With only a few exceptions, the fusion data show parallel mortality frequency distributions between the 30s and 80s neighbourhoods. These distributions are focused on the sub-adulthood and adulthood age classes. The sheep and goat mandible data do not show such close parallels between neighbourhoods (Fig. 2.5). Sheep deaths in the 30s neighbourhood are fairly evenly distributed between five age classes, whereas about 45 percent of sheep deaths in the 80s neighbourhood occur in wear stages D and E (sub-adulthood and early adulthood), which conforms closely to the bone fusion data. All of the goat mortalities in the 30s neighbourhood fall on wear stages H and I (senility), whereas goat mortalities in the 80s neighbourhood are more evenly distributed from wear stage B through H (early juvenility through early senility).

In general, these results do not support the prediction that the higher status 30s neighbourhood had greater access to animal products than the 80s neighbourhood. The bone fusion data indicate very few age-related differences between the neighbourhoods. Clear differences between the neighbourhoods are observable in the mandible data, but these differences do not suggest differential access. Sub-adult and adult sheep are relatively abundant in the 80s neighbourhood, and senile goats are relatively abundant in the 30s neighbourhood. Though these results are distinguished from the rest of the data, they do not reflect greater access to prime age sheep or goats in either neighbourhood. This line of evidence alone does not support the hypothesis.

The third measure of consumption is the differential distribution of body part units. Just as cattle data were excluded from the previous section of the analysis, they are excluded here for the same reason; cattle were not provisioned indirectly, and thus have no bearing on differential access by consumers. A body part unit is a set of articulated elements that are grouped according to meat-yield value (meat/bone ratio) (Table 2.5). Axial elements, such as vertebrae and ribs, must be considered with caution because these elements are less readily identifiable to the species level. Fragments of most axial elements were commonly identified as "medium mammal". Therefore, they are probably under-represented in Fig. 2.6, which shows the distributions of body parts for sheep and goats between the 30s and 80s neighbourhoods. The opposite problem occurs in which ubiquitous loose teeth result in a gross over-representation of crania. These quantification issues must be kept in mind when interpreting the results. As a further caution, and following the critiques of Grantham

Body part units used in analysis*

Cranium	Axial	Forequarter	Hindquarter	Lower limb
Skull	Atlas	Scapula	Innonimate	Carpal
Mandible	Axis	Humerus	Femur	Metacarpus
Hyoid	Cervical v.	Radius	Patella	Tarsal
	Thoracic v.	Ulna	Tibia	Metatarsus
	Lumbar v.		Fibula	Phalanx
	Sacrum			
	Caudal v.			
	Rib			
	Sternum			
Low	-	High	High	Low
Meat-yield value				

Note: Axial elements are not assigned a meat-yield value because they are quite variable in their meat-yield. They are also more difficult to identify to a low taxonomic level than most other elements.

* Sesamoids are excluded from this part of the analysis because they can only rarely be identified to a low taxonomic level.

Table 2.5. Definition of body part units and associated meat-yield values used in Figure 2.6.

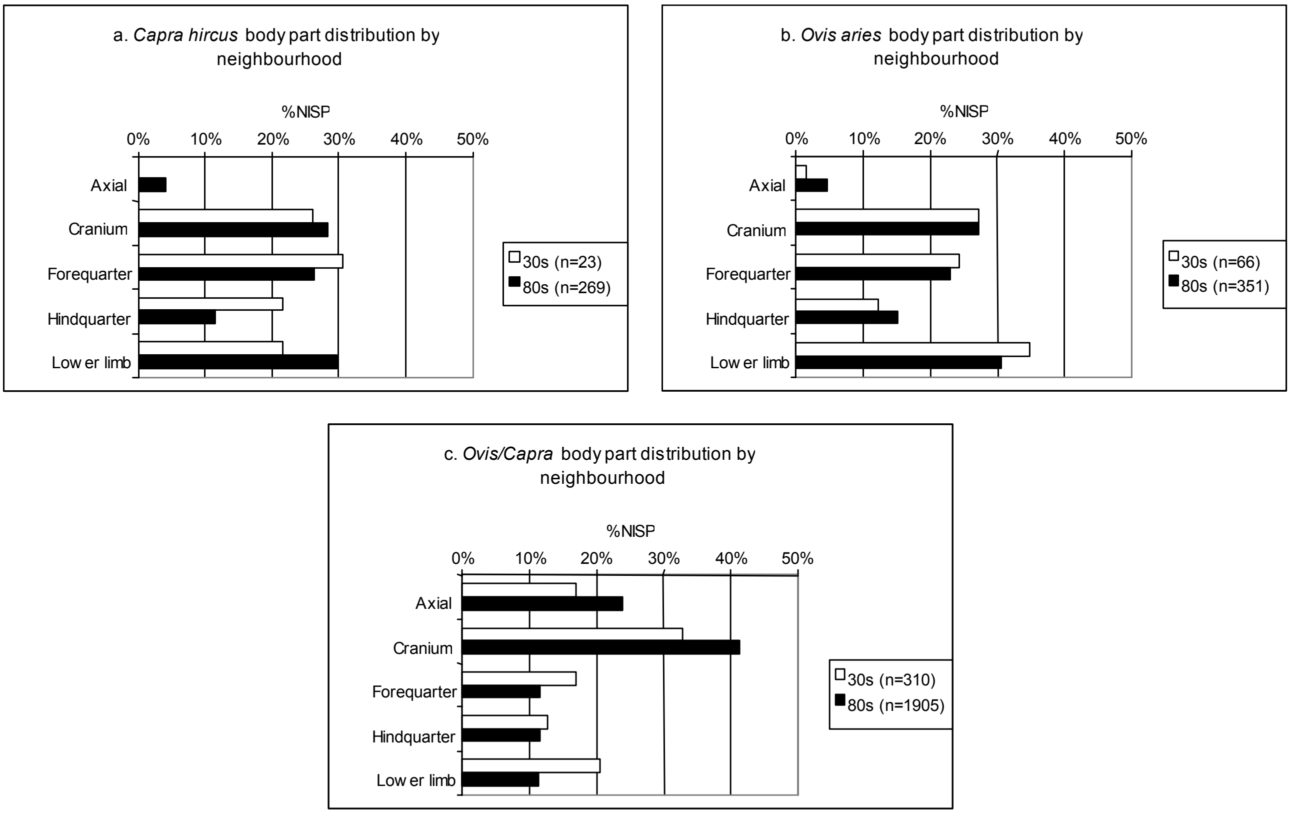


Figure 2.6. Caprinae body part distributions by neighbourhood.

(2000), it must be made clear that meat-yield is not used here as a proxy for exchange value, nor for the perceived quality of animal products. Rather, meat-yield is simply used to identify variability between spatial contexts.

The ratio of high- (forequarter and hindquarter) to low- (cranium and lower limb) meat-yield body parts is fairly even between the 30s and 80s neighbourhoods across all animal categories (see Fig. 2.6). High-meat-yield body parts contributed 12–30% of the 30s neighbourhood assemblage, and 12–26% in the 80s neighbourhood assemblage. Low-meat-yield body parts contributed 21–35% of the 30s neighbourhood assemblage, and 12–41% in the 80s neighbourhood assemblage. The 41% value represents *Ovis/Capra* crania. Of these, 59% are individual loose teeth; therefore, this value probably is misleading. For any given body part in any one animal category, frequency differences are marginal (≤10%).

The uniformity of the body part data between the 30s and 80s neighbourhood assemblages clearly indicates that one neighbourhood did not have greater access to animal products than the other. Add to this the species representation and caprine age evidence, and one can confidently conclude that access to animal products was not conditional upon the neighbourhood in which one lived. This finding is in line with Rainville's (2001, 272–274) interpretation of Titriş Höyük's architecture in which she concludes that differences between neighbourhoods are negligible.

Discussion

The perennial question begs to be asked: do the results of the preceding faunal analysis reinforce the notion that Titriş Höyük was a highly urbanized center? The above faunal analysis of pastoral economics at Titriş Höyük yielded results that both agree with and diverge from the model of Titriş Höyük as an urban economy. In this model, Titriş Höyük would have required surplus pastoral stock to be transferred from satellite communities in order to feed a growing population of non-food producing specialists. The results of the analysis regarding this issue are ambiguous, and therefore, do not refute this assertion. The possibility that Titriş Höyük *only* operated in the consuming mode, and did not produce domestic animals, was refuted by the bone element diversity data.

The other aspect of production concerning specialization can be interpreted with greater certainty. These results clearly indicate that sheep, goats and cattle were each raised and exploited for different purposes. The data suggest that sheep and cattle were primarily raised for their meat and/or milk, and goats were raised primarily for their hair and/or milk.

In the next sequence of events, the urban model predicts that since a large portion of the consuming population abstained from food production the distribution of pastoral products would have been controlled centrally. The results of the faunal analysis demonstrate that a very limited range of species was provisioned, which suggests a highly specialized operation. However, not all species appear to have been distributed indirectly. The data indicate that sheep and goats were distributed indirectly, but cattle were raised and exploited at the level of the household, without apparent state intervention.

In the last sequence of the animal exchange system, consumers in the purportedly "higher status" Lower Town (30s) neighbourhood were predicted to have had greater access to certain animal products (*e.g.* better cuts of meat), but relied less upon wild foods than consumers in the "lower status" Outer Town (80s) neighbourhood. The analysis of the spatial distribution of animal remains between the two neighbourhoods does not support the former contention. Instead, the data show that intra-site differences in species, age, and body part representations are negligible. This result suggests that the indirectly distributed sheep and goats were not provisioned preferentially to consumers according to the neighbourhood in which they inhabited. The latter contention is supported since there is a small difference in the greater availability of wild foods in the 30s neighbourhood.

Conclusions

To answer the question that was posed at the beginning of the previous section, the results suggest that Titriş Höyük was not as urbanized as originally thought. The discrepancy that has been observed between the general model of an urban pastoral economy and the model of pastoral economics at Titriş Höyük is likely a function of a false preconceived notion of what an EBA urban center should be.

Our knowledge of the processes of urbanization in early Near Eastern society has been mostly gathered from archaeological and textual materials from Uruk, Sumerian, Akkadian, Babylonian and Assyrian contexts. These states engaged in international militarily campaigns, controlled great expanses of territory and exacted tribute from their subordinate settlements in an extensive network of interaction. Some of these states even ascended to imperial status. Titriş Höyük, on the other hand, was an urban center on a much smaller scale. Its territorial breadth seems to have been restricted to the Karababa basin. Though it is possible that Titriş Höyük was a northern outpost or regional center in the Akkadian empire, there is only weak material evidence to support this position (Algaze *et al.* 1992, 47; Wilkinson 1990, 99–100). Titriş Höyük was more likely a local, indigenous center that, according to ceramic evidence, is more akin to other urban centers in northwestern Syria (Matney and Algaze 1995, 49–50; Nissen 1988, 161; Wilkinson 1990, 97).

If Titriş Höyük was the indigenous development that it appears to have been, then it makes sense that it had simpler infrastructure than Akkadian and other South Mesopotamian centers. Its utilization of productive specialization and centrally regulated distribution for certain animal products, while maintaining household-level production for others, is a sensible scenario considering its urban scale relative to that of other Mesopotamian contexts.

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3. Animal-Derived Artefacts at Two Pre-Columbian Sites in the Ancient Savannas of Central Panama. An Update on their Relevance to Studies of Social Hierarchy and Cultural Attitudes Towards Animals

Richard Cooke and Máximo Jiménez

Faunal remains are well preserved at pre-Columbian sites around the littoral of Parita Bay on the central Pacific coast of Panama. At Spanish contact in the 16th century CE, these sites would have been communities in four populous chiefdoms. The mortuary precinct at one site (Sitio Conte), which was excavated 70 years ago, received the remains of rich adult males (ostensibly chiefs and members of their lineages and war bands) as well as people of lower station. The quality and quantity of burial goods found here (including objects made of animal materials) reflect this hierarchy. Some ornaments comprised hundreds of perforated teeth and objects of worked bone. Exquisitely carved sperm whale ivory and manatee bone were reserved for people of highest rank. The burial of whole turtle carapaces may also be correlated with the upper end of the social pyramid. Some graves may have been used sequentially by lineages of males with special occupations, i.e., *hunters, bone-workers and ritual specialists. At other sites around Parita Bay, abundant faunal remains have been recovered in middens, pits, and house features. At Cerro Juan Díaz graves of lower status people that are coeval with Sitio Conte's mortuary precinct contained artefacts made out of the same kinds of animal-derived materials that occurred in the richest graves at the latter site (except sperm whale ivory and manatee bone), but in much smaller numbers. In this region, carved objects made of bone, antler and teeth often use the same animal images that appear on gold-work, polychrome pottery and whale ivory and manatee bone carvings, suggesting that they are ethnic or social group identifiers rather than animals uniquely related to elite personages. Two Spanish soldiers who participated in the conquest of these chiefdoms observed the regulation of hunting and meat-consumption by elites. But archaeozoologists have not yet confirmed these documentary details because residences occupied by high rank people have not been investigated. Some animal species whose remains are present in mortuary and midden deposits were abundant until recently or are still common in the seasonally dry savannas around Parita Bay (*e.g., *white-tailed deer and iguanas); others are scarce or absent (*e.g., *tapirs, monkeys, coatis, jaguars and peccaries). It is likely that some of these species were extirpated locally during and after the pre-Columbian period. But the degree to which human behaviour (such as food proscriptions and selective hunting), agriculture and vegetation history affected animal distributions is difficult to determine without a data set independent of human activities (such as predator bone hoards). An archaeozoological re-analysis of animal remains found at mortuary sites in 'Gran Coclé' – particularly the very large numbers of bones and teeth from Sitio Conte that remain unidentified by specialists – would improve our understanding of the relationship between pre-Columbian people, their social groups and animal species.*

Keywords: Panama, chiefdom, hunting, crafting, social hierarchy

Introduction

This paper considers animal-derived artefacts produced in pre-Columbian times in the ancient lowland savannas that border on Parita Bay in central Pacific Panama (Fig. 3.1). This was one of the most populous and socially complex regions of the 'Gran Coclé' culture area (Sánchez 2000)

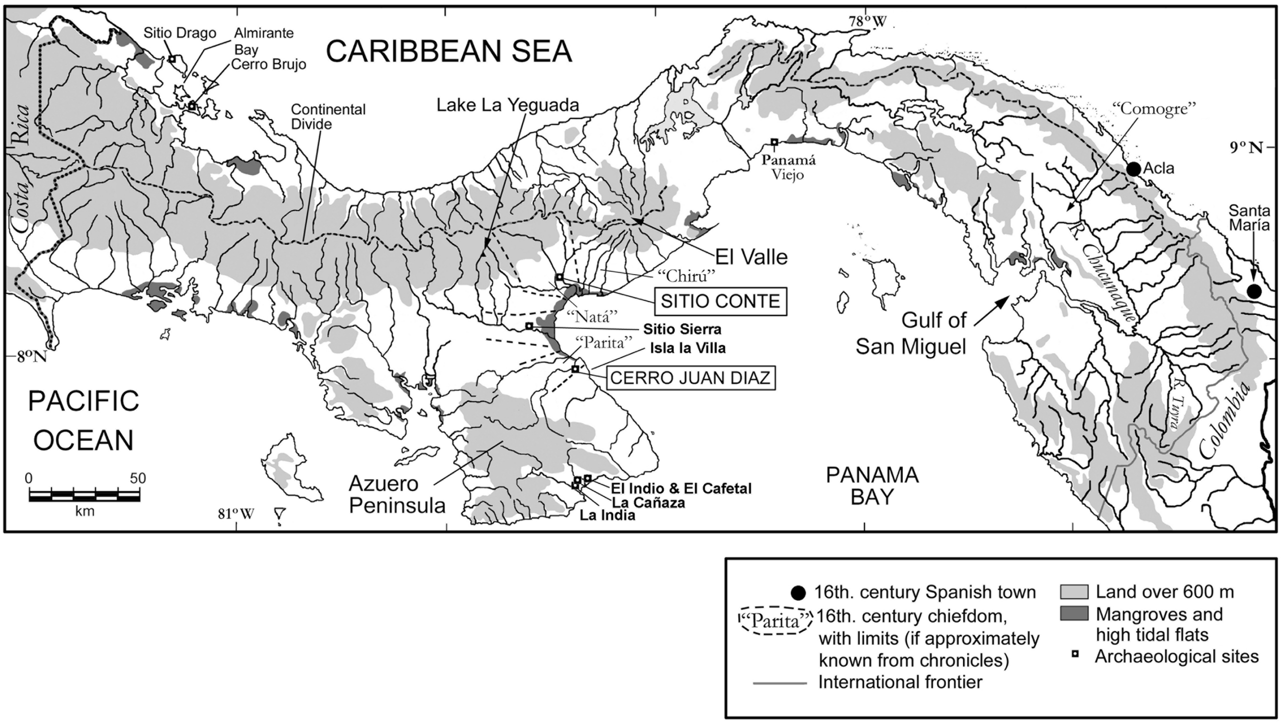

Figure 3.1. Map of Panama showing the location of archaeological sites, early colonial settlements and prominent geographical features.

whose mortuary features and distinctive imagery are well-known to anthropologists and art historians interested in the antiquity, nature, development and demise of small-scale societies classified in the New World literature as chiefdoms (*cacicazgos* or *señoríos* in Spanish). Excavations conducted nearly seventy years ago at Sitio Conte – a mortuary precinct where people at the apex of the regional hierarchy were laid to rest – brought scholars' attention to the wide variety of animal products used for making costume items, weapons, tools, and ceremonial or ritual paraphernalia. They also publicized animal images painted on pottery and modelled in clay and other media whose realism allows the identification of biologically meaningful animal taxa – sometimes even to species. These features have stimulated discussions about hierarchical relationships among people and animals. Some recent publications of ours summarized and commented on animal-derived objects found at Sitio Conte and nearby mortuary precincts used for people of lower station (Cooke 1998, 2004b); they also addressed the religious content of animal images (Cooke 1998, 2004a) incorporating and evaluating commentaries of other scholars (particularly Briggs 1989, 139–143; Helms 1977, 1979, 1995, 2000; Linares 1977). The following text is in essence an up-date, including new information about animal-derived artefacts from Sitio Conte, which Cooke examined in the Peabody Museum of Harvard University in March, 2007.

We begin by discussing associations between animal materials and ornaments and the highest ranked people buried at Sitio Conte, paying special attention to Peter Briggs' (1989) hypothesis that rank and status were closely related, not only to the crafting quality, scarcity or exotic nature of certain objects and materials, but also to the sheer numbers of goods that could be acquired and displayed. Then we compare the Sitio Conte data with information about the use of animals and animal materials at Cerro Juan Díaz (Fig. 3.1), located about 45 km to the south on the opposite coast of Parita Bay where less affluent and presumably lower rank people were buried at about the same time the richest graves were deposited at Sitio Conte. These are estimated by pottery cross-dating to have spanned the period cal 700–1000 CE. The Cerro Juan Díaz interments belonging to this period lack evidence for very rich people even though they exhibit considerable variation with regard to the sizes of individual graves, types of burial modes, and numbers of people buried in each grave (Carvajal *et al.* 2006; Cooke 2001, 2004 a, b; Cooke *et al.* 2000; Díaz 1999; Sánchez 1995). On the other hand, a small number of Cerro Juan Díaz graves, dated between cal 130 and 700 CE and thus slightly older than the Sitio Conte mortuary features, contain high quality gold, shell and animal tooth artefacts that allude to differences in wealth, status and/or occupation (Cooke 1998; Cooke and Sánchez 1998; Cooke *et al.* 1998, 2000).

The mortuary features and shell ornament workshops found at Cerro Juan Díaz provide information about cognitive relationships between people and animals. Data from the extensive middens at this site permit inferences about the use of animals for food and for making tools for everyday activities. This dimension is lacking at Sitio Conte, because the pre-World War II archaeologists who excavated it unfortunately were not interested in kitchen debris.

Long-distance trade and the attribution of material or cognitive value to goods obtained from afar are important themes in archaeologists' discussions about the ways in which elites acquired and manipulated power in Neotropical chiefdoms. With regard to Panama, this debate was fuelled in the 1970s and subsequently developed by anthropologist Mary Helms (1979, 1992, 1998). Therefore, we pay attention to the provenience of certain animal materials in the light of current paleoecological, geological and archaeozoological knowledge in order to infer the minimum distances that animals and their materials are likely to have travelled between the places where they were acquired and utilized.

Rich and poor in the Caribbean and 'Tierra Firme'

When the Spanish arrived in what (to them) was a 'new' world they did not at first encounter literate people living in cities, but smaller-scale communities dwelling in villages. Taíno chieftains in the Greater Antilles received them seated on wooden stools called *duhos,* which were exquisitely carved and sometimes embellished with gold (Oliver 2000, fig. 10.8; Rouse 1992, 9). Their rectangular residences were more spacious and better made than the round houses where villagers of lesser station lived. Even so, they were constructed of wood and thatch rather than of stone and stucco. Archaeologists have identified Taíno ceremonial sites with ball-courts flanked by earthen embankments and rows of engraved slabs and pillars of stone (Oliver 1998; Wilson 1990, 23). But these are far less imposing than the masonry ball courts and plazas built by mainland Mexicans and Maya. In 1502 Columbus's ships came across two trading canoes off the Bay Islands (Honduras) whose occupants were bringing merchandise from Mesoamerican cities: copper axes, tools of obsidian and alabaster, and cacao beans (Sauer 1966, 128–130). The implications of this encounter escaped Columbus who was intent on heading south, and away from Maya cities. Twenty canoes came out to meet him as he entered the Almirante Bay (now in Panama's Bocas del Toro province) (Fig. 3.1). A few men standing in them sported large gold disks and "eagles" suspended from their necks – manifestations of authority that the Genovese mariner considered out-of-place with their nakedness (Columbus *in* Jayne 1988, 80–81; Cooke *et al.* 2003, 109). According to Italian courtesan Pietro Martire (Pedro Mártir de Anglería), who popularized Columbus's and other conquistadors' stories in Latin, these men also wore "garlands of flowers and *crowns of lion and tiger claws*" (Mártir de Anglería 1965, 322; our emphasis). (We assume that "lion" meant the Neotropical puma [*Puma concolor*] and "tiger," jaguar [*Panthera onca*] or ocelot [*Leopardus pardalis*]).

In the decade after Columbus's isthmian journey, which quickly ended in disaster and a humiliating return to Jamaica, the Spanish attempted to colonize the humid Caribbean slopes of 'Tierra Firme' (now Panama, and the Atlantic coasts of Colombia and Venezuela). The returns from raiding and slaving were initially disappointing, but they improved as soon as Spanish war parties from the small towns established at Santa María La Antigua and Acla crossed the continental divide onto the Pacific slopes of Panama (Fig. 3.1). Here the invaders encountered more populous settlements at which gold-copper objects crafted in special workshops were exchanged for raw gold, agricultural produce, fine textiles and human captives (Cooke *et al.* 2003, 104; Sauer 1966, 246). Spanish soldier Pascual de Andagoya (in Jopling 1994, 229) asserted that one of these territories, ruled by a chief the Spanish called Comogre, was located where savannas began. Westwards the Spanish troops continued to move through parkland although they noted that patches of forest persisted on hill-tops and along rivers. They observed rubber-ball games similar to the ones played on Hispaniola (Espinosa, in Jopling 1994, 55). Chieftains and their entourages greeted them seated on ceremonial wooden chairs for which the Spanish chroniclers used the Taíno term they had learnt in the Caribbean islands: *duho* (Fig. 3.2a, b). Time and time again, their womenfolk offered them food just as Taíno leaders had done (Wilson 1990, 57): fermented brews made of maize or manioc; fish, iguanas, and deer (Fig. 3.2c–e). Archaeozoological evidence show that these meats were unlikely to have been reserved for elite personages because they were consumed at large and small sites across this region for several thousand years (Cooke *et al.* 2007, 2008).

The fertile plains and foothills bordering Parita Bay on the central Pacific coast – the geographic focus of this paper – were divided among four small and mutually antagonistic chiefdoms whose river-bank fields were planted with maize, squash and manioc (Fig. 3.1). Jerked venison hung in storehouses. Villagers kept "partridges," "pheasants" and "geese" in cages – probably Iberian terms for Neotropical quail (*e.g.*, *Colinus*), guans (Cracidae) and Muscovy ducks (*Cairina moschata*). The remains of these are found in kitchen middens across this region. Estuaries, sandy beaches and high tidal flats provided abundant shellfish, fish and salt (vital for retarding spoilage) (Cooke and Ranere 1992a; Cooke *et al.* 2007, 2008; Sauer 1966, 269–287).

Not surprisingly, Spanish governor Pedrarias Dávila ordered his captain Gaspar de Espinosa back to this region in 1519 CE expressly to provision the new city at Panama with maize, salt, clay pots, and grinding stones (in Jopling 1994, 60). It was on this journey that Espinosa interrupted the funerary rites of the chieftain the Spanish called Parita, París or Antatará (the last name perhaps a title in the extinct native language). Parita had died after a skirmish with Espinosa's troops two years before. This scene has often been described. Parita's body was wrapped in coloured cotton textiles tied up with strings. It was adorned from head to foot with gold-copper ornaments: a helmet, necklaces, cuffs, greaves, a belt with bell danglers, and large disks called *patenas* in Spanish because of their similarity to the plates used to hold the Eucharistic hosts (original account in: Jopling 1994, 63; summarized graphically in

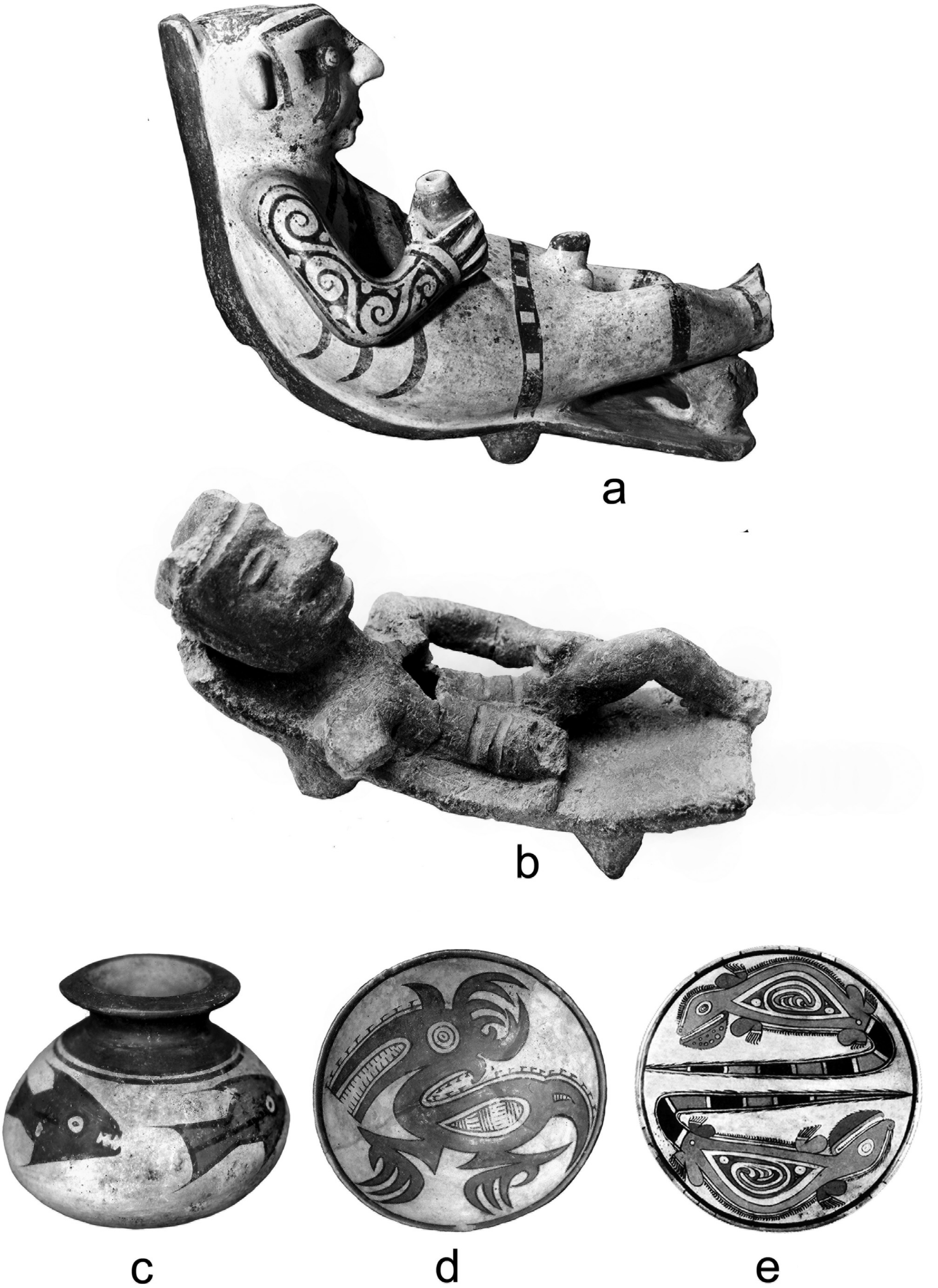

Figure 3.2. The chieftains of Panama received the Spanish on wooden stools they called "duhos", a term they had learned on Hispaniola. Fish, iguana and deer meat were invariably offered to them. a: Seated figure on a "duho." Painted in the Conte style; purportedly from Veraguas. Private collection (photo: F. Sheets), b: Seated figure on a "duho" fired in a reducing atmosphere. Cerro Juan Díaz, Operation 5. c–e: Polychrome vessel painted in the Conte style depicting fish (c), white-tailed deer with branching antlers (d) and iguanas (e). Museo de Antropología Reina Torres de Araúz, Panamá. Photos a, and c–e: R. Cooke.

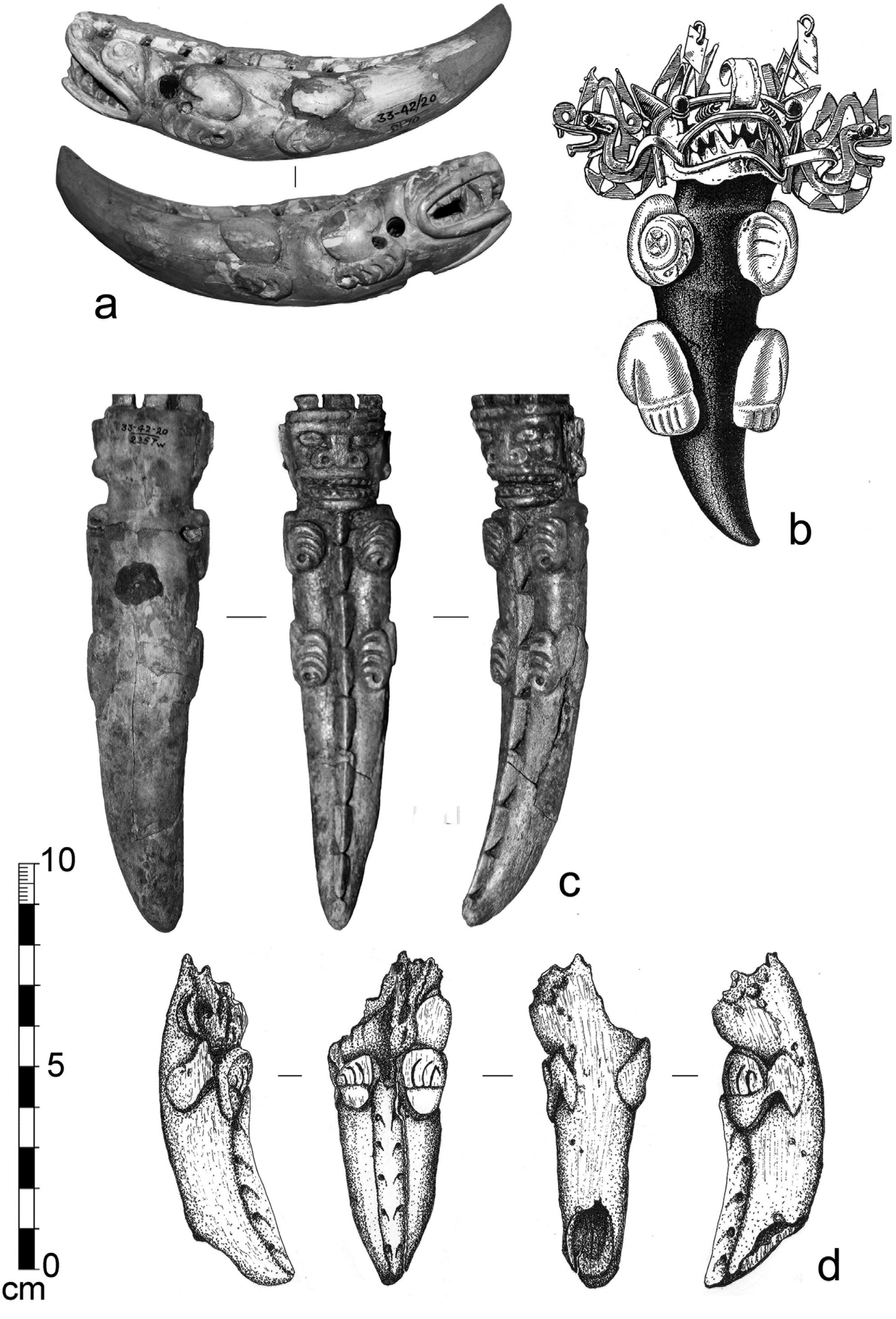

Figure 3.3. a: Carved sperm whale tooth shaped like a crocodilian, Sitio Conte, Grave 24, object 203. (Photo: R. Cooke). b: Carved whale tooth capped with cast gold head and feet, Sitio Conte, Grave 5, skeleton 15 (after Lothrop 1942: fig. 160). c: Manatee bone pendant probably representing a crocodilian, Sitio Conte, unprovenienced. (Photo: R. Cooke). d: Fragment of a figure similar to c, but wrought in deer antler. Cerro Juan Díaz, looter pit fill (Drawing: Paula Figueroa). a–c reproduced with the authorization of the Trustees of Harvard University.

Stone	Metal	Animal-derived	Vegetable
Pendants	Plaques	Bone pendants	Resin figurines
Beads	Beads	Bone figures	
Ear decorations	Disks	Bone tubes	
	Figurines	Bone beads	
	Pendants	Whale teeth	
	Nose decorations	Shark teeth	
	Ear decorations	Jaguar teeth	
	Bells	Other mammal canine teeth	
	Cuffs	Peccary tusks	
	Greaves	Sting-ray spines	
	Rings		
	Helmets		

Table 3.1. Artefacts considered to be sumptuary or costume items found in the graves at Sitio Conte, Panama (after Briggs, 1989: 137).

Cooke 2004b, Fig. 3.3). Chief Parita enjoyed a degree of regional paramountcy due to recent successes as a warrior (Andagoya in Jopling 1994, 35). But the chroniclers say that he lived like his "subjects" (as the Spanish called them): in a *bohío*, *i.e.*, a house with cane walls and palm frond roof capped with a clay vessel (Carvajal *et al.* 2006; Cooke *et al.* 2003, 120; Lothrop 1937, 46).

During a battle with chief Parita in 1517, Espinosa's troops were challenged by a native "captain" who was "bedecked with many gold patens, armour and cuffs placed on a cotton cloak" (in Jopling 1994, 50). Ten years later Spanish troops from the recently founded township of Natá fought a battle with Pocoa, another native chieftain who was holding out in the Pacific foothills of Veraguas province. According to Spanish chronicler Fernández de Oviedo (1853, 118) who was in Panama at this time, Pocoa appeared "at the head of 500 or more warriors, with a great disc of gold on his chest, holding throwing-spears in his hands." Oviedo commented that it was "the custom in these parts for the chieftains and principal men to bring to battle a gold jewel on their chest or arms, in order to be identified and recognized among their own people and even by their enemies." High rank people in these chiefdoms made a considerable effort to advertise their station by accumulating and displaying costume and sumptuary items.

Archaeological evidence for elite and non-elite burials in central Panama

Elite burials

Prehistoric mortuary arts that provided archaeological confirmation of the rich attire of contact-period chiefs like Parita and Pocoa were discovered by Harvard University and University of Pennsylvania Museum archaeologists in the 1930s and '40s at Sitio Conte, located 12 km inland from the present-day Parita Bay coastline. This site lay (and still lies) under pasture without obvious surface indications of the mortuary precinct underneath. Lothrop (1942) thought that the sample of burials he and his colleagues unearthed pre-dated Spanish colonization by only 200 years (1330–1520 CE). But recent re-evaluations of the antiquity of painted pottery styles found in the graves, supported by radiocarbon dates, suggest that they are somewhat older (most graves are now estimated to belong to the period cal 750–950 CE, with a few being slightly earlier or later [700–750 and 950–1000 CE] [Briggs 1989; Cooke *et al.* 2000]). Their structural simplicity (cut through the river-bank soils without architecture) belied the striking quantity and quality of the mortuary goods. Lothrop (1937, 48) proposed a three-tiered category of small, medium and large graves. The last-named category contained 3–22 bodies, ~200 pottery vessels, and large numbers of personal ornaments. These were made of gold-copper alloy, polished stone, and resin, as well as animal bones and teeth. The fact that these mortuary goods were deposited singly or in groups on or near the human remains suggests that they were costume items (*e.g.*, necklaces, shirts, belts, danglers and ankle decorations), ritual objects (*e.g.*, batons) and, in a few cases, perhaps weapons (*e.g.*, spear points and spear-throwers). One can imagine the visual impact that the display of glittering gold ornaments, brightly coloured clay vessels, bone shirts, bone belts and – one assumes – feathers, pelts and polychrome textiles, would have had on the people gathered around the edge of a tomb containing the mortal remains of an important local dignitary seated under fabric awnings in the midst of extended and prone bodies (Linares 1977; Lothrop, 1937, fig. 31).

Art historian Peter Briggs (1989) arranged the 100 graves studied by the Harvard and Pennsylvania teams at Sitio Conte into ten hierarchically ranked clusters based on the quantity and nature of artefacts recorded in each grave. The most complex graves were dominated by adult males (Briggs, 1989, 132). High-rank males possessed not only the greatest *number*, but also the most *classes* of mortuary arts. They were also buried with proportionally more sumptuary and/or costume items (Table 3.1). These comprised 76% in Cluster 1 graves as opposed to 11% in the bottom-ranked Cluster 9 graves.

Briggs (1989, 138) concluded that the Sitio Conte mortuary pattern demonstrated "that the identification of status by mortuary arts, especially sumptuary or costume items is…an *additive process* (our emphasis). An individual of high status received specific 'extra' mortuary arts, which were in addition to those he would have received as a member of a lower status." Briggs' analogies with the US army rank system add spice to his interpretations: "The social identity of any individual is constantly enhanced by the additional display of the total number of sub-group statuses achieved. These emblems are displayed *in toto*: the individual does not display only the most recent acquired medal of a sub-group affiliation."

Non-elite burials

Fernández de Oviedo publicized the idea that people of lower station and "slaves" in Panama were not assigned formal burial but rather left to decompose in the woods (Lothrop, 1937, 43). Perhaps war captives who were not executed received this treatment. Even so, mortuary data obtained at several pre-Columbian sites located around Parita Bay and on the Azuero Peninsula, which date from *ca.* cal 200 BCE to cal 1400 CE (Fig. 3.1), show that some people of lower station were afforded considerable care and attention after they died even though they were buried with small numbers and few categories of burial goods. In some cases, they owned no imperishable grave goods at all. Many examples of secondary burials found in non-elite mortuary precincts involve individuals whose bones had been encased in some kind of fabric before being deposited in the ground or were placed inside pottery vessels (in a few cases, cremated). Phytolith evidence from Cerro Juan Díaz suggests that bark cloth was used for wrapping bodies (Cooke *et al.* 2000, 166). This behaviour alludes to protracted multi-stage burial rites or alternatively, to people from outlying areas bringing the bundled remains of their relatives to special funerary precincts to be re-buried, perhaps at communal ceremonies or at appropriate times of the year. The intentional burial of body parts, *i.e.*, whole and partial skulls, mandibles, maxillaries, and limb bones, and the use of human teeth as pendants and for necklaces, may not derive from violent behaviour (*e.g.*, Lothrop 1954), but rather, from the custom of keeping ancestors' relics (Briggs 1989, 20–63; Cooke 2001; Cooke *et al.* 1998; Cooke and Sánchez 1998; Díaz 1999; Ichon 1980; Isaza-Aizuprúa 1993).

In contrast, little evidence was found for secondary burials at Sitio Conte (although it is likely that the seated bodies of some individuals of highest rank were desiccated previously by exposure to fire and displayed in mortuary houses – a behaviour that is described in several contact-period chronicles) (Andagoya in Jopling 1994, 31; Fernández de Oviedo 1853, 154–5; Mártir de Anglería 1965, 233). The distribution of sex and age categories in the Sitio Conte mortuary precinct is also notably different from that observed at other sites in the 'Gran Coclé' culture area: ninety percent of the 157 skeletons that were aged and sexed in the field were classified as adults, 9% as adolescents, and only 1% as children. Seventy-two adult skeletons (77%) were male and 21 female (23%) (Briggs 1989, 73). All but one of the females at Sitio Conte was buried in conjunction with an adult male (Briggs 1989, 130).

In mortuary precincts at other sites proportionally more women and sub-adults were buried, including children and infants. At El Indio, El Cafetal and La Cañaza (Fig. 3.1), Ichon (1980) aged 132 skeletons in the field, classifying 58 (44%) as adults, 41 as adolescents (31%) and 33 as children (25%). At Cerro Juan Díaz, a sample of 115 individuals recovered from 38 funerary features produced 50 sub-adults and 65 adults. Díaz's laboratory study (1999, 88) classified twenty-one (42%) of the sub-adults as neonates or infants. She identified twenty-six of the 35 adult skeletons that could be sexed as female, and nine as male.

We cannot be sure that the methods used to age and sex these human remains were consistently reliable, Nonetheless the available data suggest, firstly, that the status of an individual in this society was not pre-determined at birth, and, secondly, that females did not become as wealthy or politically influential as males. Fernández de Oviedo's well-known comment on the Cueva polities of eastern Panama summarizes the influence of heredity and individual prowess on chieftainship: "One way in which a person of common or low or plebeian status rises to be a lieutenant (*cabra*)", he remarked, "is by fighting energetically when his chief is wounded in a battle with another chief…But what generally happens in succession is that the most able person *among those who vie for the inheritance* ends up being Lord" (1853, 130, 133). We italicized the term *inheritance* (*herencia* in Spanish) because it is clear that genealogy and ancestry were determinants of rank, *i.e.*, chiefs probably were drawn only from social groups, which were at the apex of the local or regional hierarchy. We have commented elsewhere (Cooke 2004b; Cooke and Ranere 1992b) that 'Gran Coclé' society may have been organized into ranked and named clans, which would have used animal and plant identifiers in the manner of some surviving lower Central American ethnic groups, such as the Bribri and Cabécar (*e.g.*, Stone 1961, 75–81). One animal whose image alludes to such an association is a crocodilian (often humanized), which is prominent on art objects found around Parita Bay, and will be referred to in later pages (Cooke 1998, 2004a, fig. 9; see also Helms 1977, 1979).

Biases in the data

Certain biases and imperfections in the available data should be emphasized at this juncture. In the first place, it is important to stress that a formal archaeozoological evaluation of animal-derived materials found at Sitio Conte has never been undertaken. Archaeologists Lothrop and Mason occasionally asked museum biologists for help identifying animal materials, but their identifications (*e.g.*, "jaguar bone," "deer vertebra," "sperm whale ivory," or "manatee rib") have not been verified since the 1940s. Perusal of published illustrations and Cooke's 2007 observations on materials curated at Harvard University suggest that many of the identifications that were made, are sound. Others, such as "174 rabbit teeth" – recorded in Cluster 1 Grave 74, whose excavation was supervised by Mason (Briggs 1989, 202) – may not be if these teeth were labelled on site and were not identified by a Harvard biologist. Spanish-speaking Panamanian country-folk who live near Sitio Conte use the term "spotted rabbit" ("conejo pintado") for the hystricognath rodent *Agouti paca,* whose remains are widespread in pre-Columbian middens around Parita Bay (Cooke *et al.* 2007, 2008).

Another impediment to objectivity is the fact that the Harvard and University of Pennsylvania archaeologists did not save many artefacts of bone and teeth even though they recorded their contexts carefully in the field. For this reason, we have to take at face value some generalizations such as "turtle shells" and "dog teeth" many of which were discarded during the excavations. It is particularly unfortunate that very few of the turtle shells frequently deposited whole on several grave floors were saved (no photographs have been published). Lothrop described three carapaces deposited in high rank Grave 26 at Sitio Conte as belonging to "sea turtles." But the drawings in the grave plans are too stylized to permit distinguishing, say, green turtle shells (*Chelonia mydas*) (the marine species that is most frequently captured around Parita Bay today [Cooke and Tapia 1994]) from very large carapaces of the painted terrapin (*Trachemys scripta*), which occurs frequently in pre-Columbian middens and is still abundant (Cooke and Ranere 1989; Cooke *et al.* 2007, 2008; Lothrop 1937, 273, fig. 245).

Another problem for interpretation is contradictory recording. For example, an illustrated carved bone pendant found in Grave 32 (Lothrop 1937, fig. 158b) is identified as "bone," but recorded as "whale tooth" in the artefact catalogue (Lothrop 1937, 288). Briggs (1989, 207) noticed that the recording of bone objects by the University of Pennsylvania team was not as thorough as that of the Harvard team whose generally meticulous field records allow us to associate animal-derived artefacts quite accurately with some human individuals or groups of individuals whose sex and age were estimated by the archaeologists *in the field*. In fact, Briggs could not locate many of the bone and tooth artefacts recorded by the Pennsylvania team. For this reason, in our following discussion we emphasize Cluster 1 graves excavated by *Lothrop* (1, 5, 26 and 32).

Lastly, the constant re-use of graves and re-depositing of skeletons complicates associating specific artefacts or groups of artefacts with particular individuals and compromises quantitative analyses. Graves were often used more than once suggesting that the deceased buried in them belonged to a lineage or other social group. Individual graves or groups of graves appear to have been carefully tended (for example with pole-and-thatch superstructures similar to those used by the historic Kuna of San Blas) (Carvajal *et al.* 2006; Linné 1929, 250 and fig. 61).

High rank graves at Sitio Conte

The Sitio Conte graves contained many items made out of bone and teeth. Shell, however, was scarce, and generally poorly preserved (Lothrop 1937, 131) in contrast to other funerary sites in the region at which many costume and sumptuary items made of marine shell have been reported (Cooke and Sánchez 1998, figs. 5 and 6; Cooke *et al.* 1998, figs. 9 and10; Ichon 1980, figs. 86–89).

Eight categories of sumptuary and costume goods were concentrated in Briggs' top three grave clusters at Sitio Conte (comprising graves 1, 5, 26, 32, 74 and 91): 1) six kinds of gold-copper artefacts (plaques, disks, cuffs, greaves, pendants, and head coverings), 2) large bone tubes, and 3) and carved whale teeth (Briggs 1989, 131 138). Only one individual (an old male buried in Category 1 Grave 5) wore a gold *helmet*. We remarked above that Spanish eye-witnesses say that chief Parita's dead body was also capped with a gold helmet. The connotation of this artefact category with highest rank is confirmed by post-contact documents. In 1528 a chieftain from the central mountains of Panama (Veraguas) handed over his golden helmet to a Spanish official in the town of Natá as a token of submission (in Jopling 1994, 174). A Kuna "emperor" befriended by English pirates in the 1680s CE wore a "belt of tiger's teeth and a hat of pure gold" as well as a shell-shaped gold nose-ring (Lionel Wafer, quoted in Lothrop 1937, 137). One assumes therefore that the seated old male in Grave 5 at Sitio Conte was, like Parita and the Kuna chief, at the apex of the regional social hierarchy. His helmet was decorated with a repoussé anthropomorphic crocodilian, one of the images which have been interpreted as biomorphic symbols of social affiliation or affinity across the 'Gran Coclé' culture area (Lothrop 1937, figs. 107 and 108; Cooke 1998). Lothrop (1937, fig. 217) proposed that this individual was buried seated, wrapped in textiles and under a bark cloth awning. If so, he may have been displayed prior to burial in a mortuary house similar to the wooden building that Spanish troops observed at the main village of chief Comogre (probably on the upper Chucunaque river in the Darién) where the embalmed and shrouded corpses of ancestors were suspended by cotton cordage from the roof (Carvajal *et al.* 2006; Mártir de Anglería 1965, 233).

Only two animal-derived objects were found in indubitable association with this rich old chieftain because Sitio Conte's Grave 5 was disturbed in prehistoric time. One was an object finely carved from a material identified by Lothrop (1937, 170, 230) as whale tooth ivory "from the lower jaw of a female sperm whale" (*Physeter macrocephalus*) (Fig. 3.3b). The arms, legs and head of this pendant were set in gold; the head depicts a creature with eyes on stilts, pointed ears and upturned nose like a leaf-nosed bat's. Three whale teeth carvings were recovered alongside the principal (adult male) occupant of Grave 26, which Briggs also assigned to his top-ranked Cluster 1. According to Lothrop (1937, 269) Grave 26 was the "largest burial from the point of view of area, number of bodies and amount of funeral furnishings." Two carved whale teeth accompanied another individual in the same grave (Skeleton 7, probably an adult male).

The fact that only 18 whale teeth artefacts were recovered in 100 Sitio Conte graves suggests that scarcity enhanced their value. Contact-period documents do not mention native whaling in Panama where pre-Columbian watercraft did not advance beyond the single-hull dugout canoe (Cooke and Sánchez 2001). Recent biological surveys classify free-swimming sperm whales as "sporadic" in regional waters (*e.g.*, Rasmussen *et al.* 2004, table 7). But 19th century CE records include Pacific Panama as a whaling ground for this species (NOAA 2006). Mass sperm whale strandings have been reported in the eastern tropical Pacific, *i.e.* in the Gulf of California and Ecuador (Félix 2005; Vidal and Findley 1986). We assume therefore that stranded sperm whales – probably infrequent but not necessarily *distant* – were the source of the ivory used at Sitio Conte. This material is ideal for delicate carving. The relationship between crafting standards and social rank – a theme that has been amply and elegantly evaluated by Mary Helms (1977, 1993) – is exemplified by the crocodilian image carved on the whale-tooth ivory pendant found in Sitio Conte's Grave 24, which is illustrated in Fig. 3.3a (see also Lothrop 1937, fig. 158a).

The only other animal-derived artefact which was the indisputable personal property of the old helmeted *cacique* in Grave 5 was a "fossil tooth" (Lothrop 1937, 234). We presume it is shark since eight fossil shark teeth out of a total of 13 found at Sitio Conte were recovered in the interments made in Grave 5 before this old man was laid to rest. Lothrop (1937, fig. 190) identified these teeth as *Carcharodon megaladon*, a large lamniform species commonly found in Neogene marine sediments worldwide whose fossils are widespread in the Caribbean (Fernandes dos Reis 2005). Current geological knowledge suggests that it is more likely that pre-Columbian people obtained fossil shark teeth along the Caribbean slopes of Panama than on the Pacific side. Intuitively the most probable source is the Gatún Formation, about 125 km northeast of Sitio Conte as the crow flies. Recently, however, there have been hearsay reports of *C. megalodon* teeth being recovered near the town of Aguadulce, near the Pacific coast and only 15 km from Sitio Conte, some of a very large size like the 13 cm long example found in Grave 26 (Lothrop 1937, fig. 190b). Such large teeth have not been reported from the Gatún Formation (O'Dea, personal communication 2007). The regional culture appears to have assigned ritual properties to *C. megalodon* teeth: two specimens painted red and black were found in Grave 26 adjacent to a clay incense burner and associated with natural hematite nodules (Lothrop 1937, fig. 29, 271). To our knowledge, they have not been reported at other sites in the region.

Probably the principal occupant of Grave 5 owned additional artefacts made of animal materials, which have been lost because of disturbance. On the other hand, Grave 1 (also assigned to Briggs' Cluster 1) was one of few that were not disturbed by later mortuary activity and therefore provides a more precise evaluation of the quantity and quality of goods buried with the richest individuals. The four people laid to rest in this feature were all adult males. Animal paraphernalia were found in varying quantities on or near the bodies of each individual. The principal occupant (Skeleton 1) was an "old man with greatly worn and decayed teeth" perhaps buried seated (Lothrop 1937, 211). Thirty-three of the 56 sumptuary and costume items that were buried with him were made of gold-copper alloy, including cuffs and a nose pendant. Animal-derived offerings included five carved manatee ribs, a whale tooth set in gold, and two composite artefacts that utilized animal teeth and other organic materials. Lothrop (1937, 133 and fig. 105) proposed that one of these was a leather apron decorated with dog teeth (Fig. 3.4a). Cooke inspected this artefact in 2007. Ninety-six canine teeth and at least 853 split molars, premolars and incisors remain intact. It is important to verify in the future that *all* the teeth are domestic dog (without comparing them with reference skeletons Cooke thought that some were not dog); as we point out below, smaller necklaces of perforated animal teeth found in low status burials at Cerro Juan Díaz contain raccoon (*Procyon lotor*) and tayra (*Eira barbara*) teeth as well as *Canis*. It is possible that the ancient inhabitants of this part of Panama placed domestic dogs and other similar-sized carnivores in the same ethnobiological category (Cooke 1998). Lothrop (1937, 211 and fig. 33) described the second composite artefact (Fig. 3.4b) as a "gorget." It consisted of several long thin tubular beads, perforated dog canines, and a carved manatee (*Trichechus manatus*) rib. This group of objects was associated with a large gold metal disk and a gilded metal effigy pendant. Cooke (2004b, 278) assumed that the long thin beads were not bone, but *Spondylus* shell because Lothrop's photographs suggested that they were strikingly similar in shape and dimensions to >400 shell beads found in two graves at Cerro Juan Díaz (Cooke and Sánchez 1998, fig. 5f; Cooke *et al.* 2000, fig. 8.7, r–t). Ocular inspection, however, shows that Lothrop was right: these beads *are* bone albeit from an as yet unidentified vertebrate.

Like sperm whale ivory, manatee ribs are an excellent medium for carving (Fig. 3.3d). Their use by Pacific-side communities in Panama goes back to the Late Preceramic period (cal 6000–4000 B.C.E.) (Cooke and Ranere 1992a). They cannot have been acquired locally since it has not been demonstrated that manatees were present on the Pacific coast of tropical America subsequent to the closure of the isthmus >3 mya. Manatee bones found in middens at two western Caribbean sites, Cerro Brujo and Isla Drago (Fig. 3.1), confirm that these large marine mammals were hunted contemporaneously with the Sitio Conte funerary activities (Wing 1980; Wake 2003–4, 2004). But manatee bone could have been obtained on the coast immediately to the north of Sitio Conte where these animals were still present in the 1970s (a straight line distance of 80 km). At Sitio Conte, Grave 1 reported the maximum number of carved manatee ribs (seven out of a total of 15 found at the site). Four were found associated with Skeleton 1 and three with Skeleton 2. Finely carved manatee bone artefacts whose function appears to have been ceremonial were found at another burial ground located to the southwest of Sitio Conte (El Hatillo or Finca Calderón), which was used

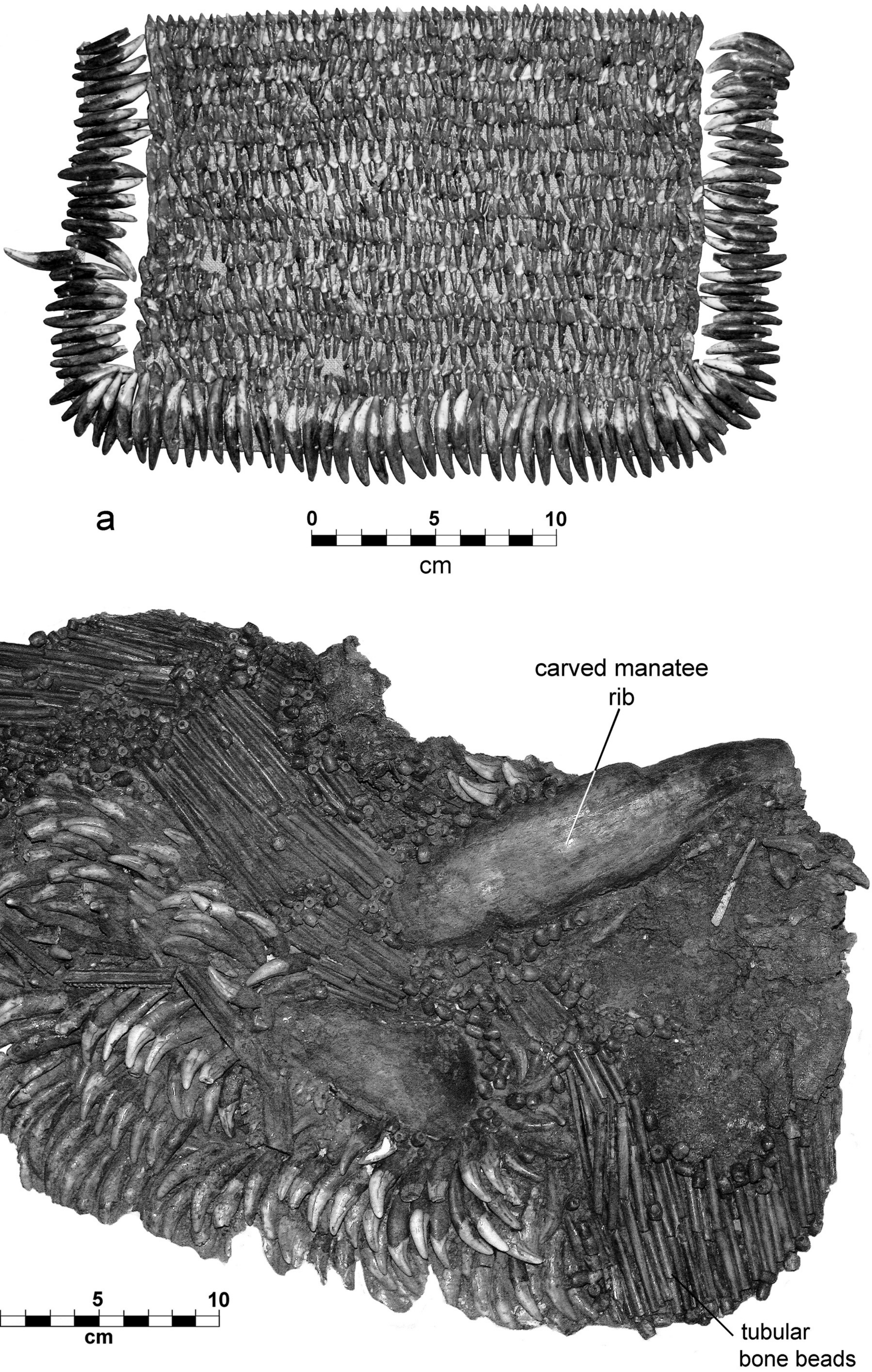

Figure 3.4. a: Possible apron made of dog and probably other mammalian teeth, Sitio Conte, Grave 1, Skeleton 1. (Photo: R. Cooke). b: Group of bird bone tubes, dog teeth, beads and a manatee bone probably forming a single artifact. Sitio Conte, Grave 1, Skeleton 1. (Photo: R. Cooke). Photographs reproduced with the authorization of the Trustees of Harvard University.

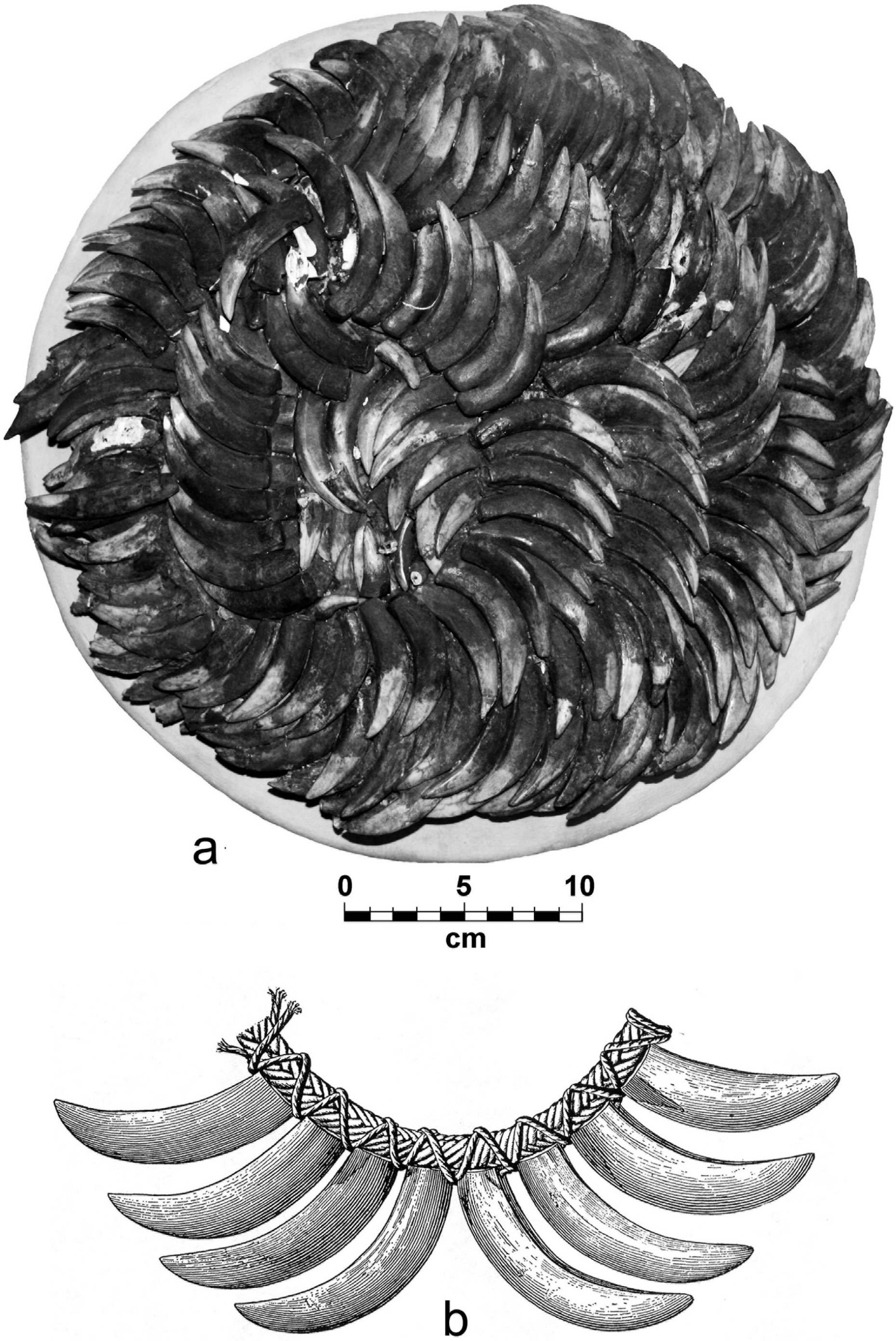

Figure 3.5. a: Group of peccary (Tayassuidae) incisors supposedly forming eight different necklaces. Sitio Conte, Grave 1, Skeleton 3. (Photo: R. Cooke). b: ethnographic example of a peccary tusk necklace, Río Purima, Brazil (partial drawing, not to scale). After Lothrop 1937: fig. 131. (Reproduced with the authorization of the Trustees of Harvard University).

several centuries later for high status people (Cooke 2004b, 277–278; Haller 2004; Ladd 1964, 270 and plate 1).

In addition to the “apron” and “gorget” (Fig. 3.4) the central occupant (Skeleton 1) of Grave 1 possessed seven other strings of animal teeth, some identified by Lothrop (1937, 170) as “dog” and others simply as “perforated teeth.” A notable feature of the attire of Skeleton 2 in this grave was a group of peccary (Tayassuidae) tusks (Fig. 3.5a). According to Lothrop (1937, 130 and fig. 130) this item comprises at least eight necklaces strung in the manner illustrated in Fig. 3.5b (the ethnographic example is a necklace belonging to the Mayongon [Maquiritari] native group located according to Lothrop on the River Parima, between Brazil and Venezuela). Lothrop (1937, 215) proposed that this “robust and powerful male” also wore a “shirt” decorated with bone tubes, which reached from his shoulders to the middle of the thighs. The tubes were discarded in the field. A smaller cluster of bone tubes was found near the feet suggesting that they formed an ankle decoration. Lothrop (1937, 201) mentions that the

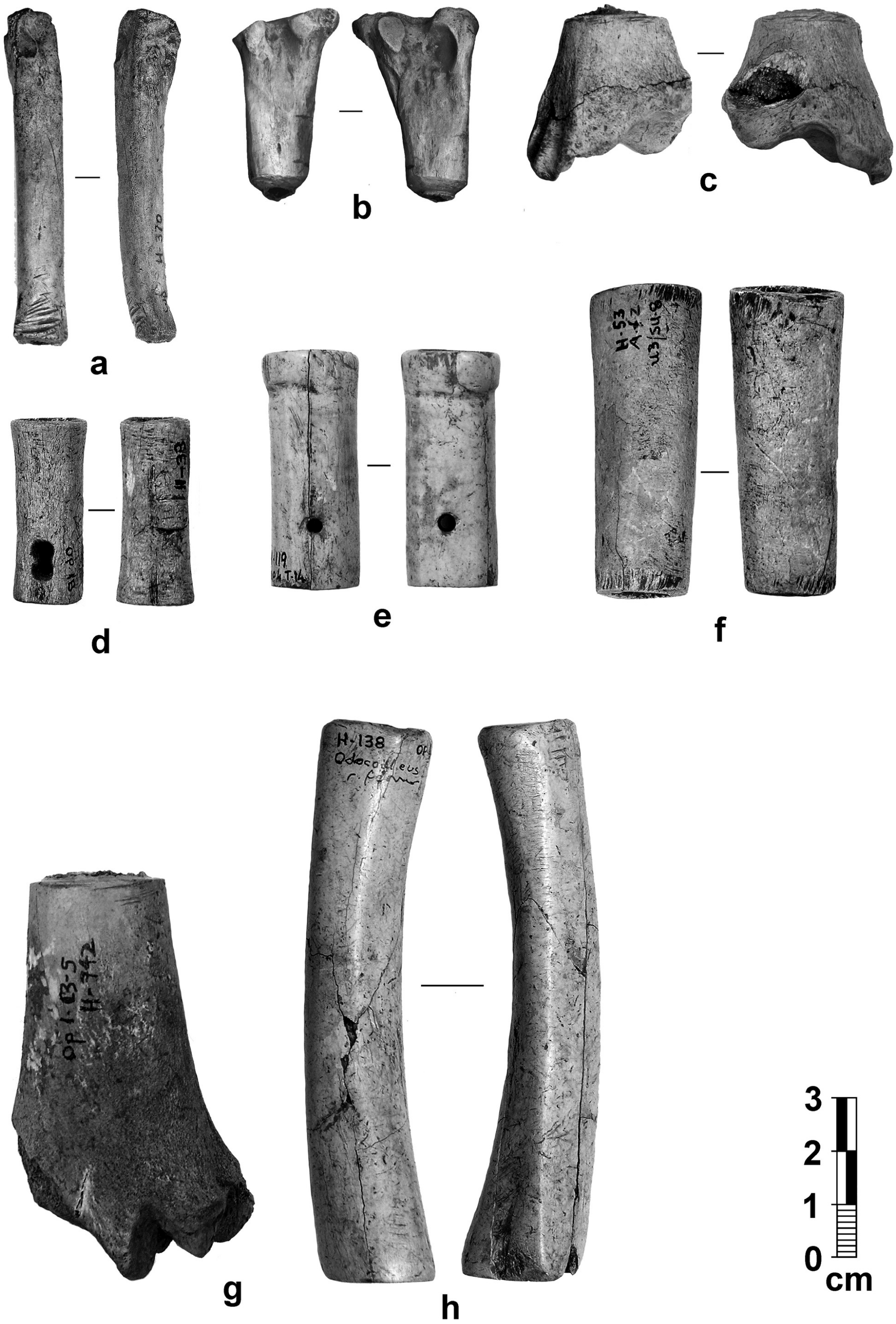

Figure 3.6. Cut and worked mammal bone from Cerro Juan Díaz, Panamá. a: Puma concolor, metapodial, Operation 3, refuse deposit, b: Panthera onca, proximal 3rd. right metatarsal, Operation 5, refuse deposit; c: Puma concolor, distal right tibia, Operation 7, refuse lens, d: Deer (cf. Odocoileus), metatarsal, diaphysis, perhaps a spout, Operation 1B, burial, artefact 5; e: mammal, perhaps deer, Operation 4, burial (R. 14, Individual 26), polished, perhaps a spout, f: deer (cf. Odocoileus), right humerus, diaphysis, unfinished tube, Operation 3, refuse deposit, g: Deer (Odocoileus), distal right femur, immature, cut to use the diaphysis for a tube, Operation 1B, refuse deposit, h: deer (Odocoileus), medial right femur, polished, Operation 4 (burial, F. 10). (Photos: R. Cooke).

most robust bone tubes found in other graves at Sitio Conte were fashioned out of deer and jaguar (*Panthera onca*) limb bones. That deer bone was used seems likely. A cut and polished deer (*Odocoileus virginianus*) humerus tube found in a low status burial at Cerro Juan Díaz (Fig. 3.6h; Cooke 2004b, fig. 8b) is very similar to an example found in Grave 32 at Sitio Conte, to be discussed shortly (Peabody Museum cat. no. C-12261; Lothrop 1937, fig. 196c).

In spite of Lothrop's assertion that jaguar bone was made into tubes, the excavation records suggest that

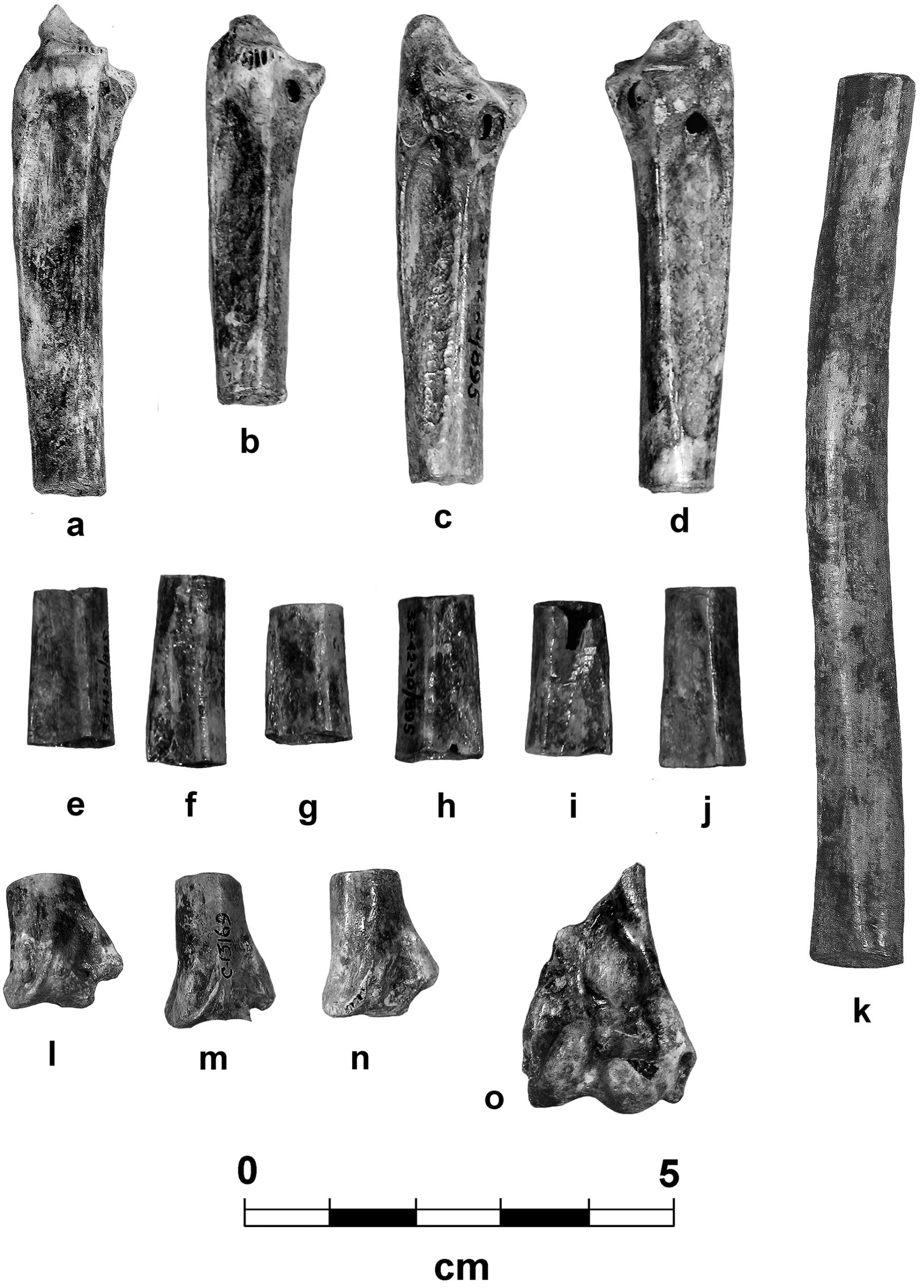

Figure 3.7. Cut and worked booby (Sula) bones from, Sitio Conte. a–k: 32–42–20/895, Grave 1, artefact 303. (a–c: proximal right ulna, d: proximal left ulna, e–j: fragments of ulnae, k: humerus shaft). l–o: C–13169, Grave 4 (l–n: distal right ulnae, o: distal right humerus) (Photos: R. Cooke). Reproduced with the authorization of the Trustees of Harvard University.

felid remains are rare in mortuary features at Sitio Conte occurring in only seven of 100 graves (Cooke 1998). Only three burial contexts produced more than one felid bone or tooth. Nevertheless the fact that the maximum number of 11 felid elements – described as "claws" (Briggs 1989, 202) – came from a Cluster 1 grave (74) is significant as it recalls the stories told to Pietro Martire of "crowns of lion and tiger claws", which we mentioned earlier. Some bones of jaguar and puma (*Puma concolor*) found in middens at Cerro Juan Díaz had been scored and snapped in order to make tubes out of the diaphyses (Fig. 3.6a–c).

Skeletons 2 and 3 in Grave 1 appear to have owned belts made of smaller bone tubes, which Lothrop suggested (1937,199) were bird. Bird bone tubes were also deposited alongside Skeleton 4 in this grave ("an aged male with worn teeth" [Lothrop 1937, 216]), in this case amid piles of sting-ray spines and shark teeth. Cooke's inspection of 23 of these tubes in March, 2007, shows that they are cut booby (*Sula*) ulnae (Fig. 3.7a–j; 33–40–90/895). Bone tubes from graves 4 and 13 at Sitio Conte (belonging respectively to Briggs' clusters 6 and 5) were also fashioned from booby ulnae and humeri, either cut into long pieces (with perforations for passing a string at the proximal and distal ends) or shorter lengths of diaphyses (Fig. 3.7k–o).

It is noteworthy that the four adult males buried in Grave 1 were all associated with large numbers of sting-ray spines and shark teeth deposited *together*. One pile buried with Skeleton 4 contained the booby bone tubes mentioned above as well as a metal chisel. Perhaps the spines, teeth and chisel were deposited in a fabric bag decorated with booby bone tubes. Another pile of sting-ray spines and shark teeth placed with the same body included chipped stone blades. Skeleton 2 was buried with a necklace of perforated shark teeth (Lothrop 1937, fig. 132a), an "arrow cache of bone and stone blades, sting-ray spines and shark teeth," and a pile of sting-ray spines and bone "awls." Skeleton 3 was buried with nine sting-ray spines and a sting-ray spine "chisel."

The use of shark teeth and sting-ray spines for weaponry is not a far-fetched inference (Cooke 2004b, 275). Spanish chronicles of the contact period refer to cane or black palm wood spears hurled with spear-throwers and tipped with "flint" (Andagoya in Jopling 1994, 31) or with *animal and fish bone* (Fernández de Oviedo 1853, 129; our emphasis). They also describe "pikes" (*picas*) studded with shark teeth (Espinosa in Jopling 1994, 57). It is possible, then, that the deposits of sting-ray spines, shark teeth and pointed chalcedony tools in Grave 1 at Sitio Conte were part of a weapons "kit", be it for hunting or fighting. From a cognitive point of view, the co-occurrence of these marine fish remains with booby bones is consistent, not because boobies are likely to have caught rays and shark, but because boobies epitomise excellence at fishing being able to locate and catch submerged prey efficiently from a great height. At Cerro Juan Díaz several booby long bones had been intentionally scored and cut to make artefacts (Cooke *et al.* 2007, 2008). Jiménez identified a blue-footed booby (*Sula nebouxii*) rostrum that was reported in a pre-Columbian grave at Panamá Viejo (Mendizábal 2004, 149). It was likely to have been used as a charm or amulet.

Two possible interpretations of the Grave 1 animal-human associations come to mind. One is that hunting prowess is being advertised. The large quantities of dog and peccary teeth found with two of the adult males in this feature, and their display as groups of necklaces, lend support, *i.e.* the more dogs owned, the more peccaries hunted. The available archaeofaunal data from Panama suggest that dogs were not used for food (Cooke 2004b). At Cerro Juan Díaz 108 domestic dog elements found in funerary and non-funerary features comprise 63 teeth (58%), four mandibular and maxillary fragments (4%), 27 paw parts (phalanges, metapodials, calcanea and astragali) (25%) and 14 other post-cranial elements (13%) of which twelve may have belonged to disturbed dog burials since they were all found in the same grave fill in Operation 6-K (Carvajal *et al.* 2006). The only *Canis* non-paw post-cranial bones found in stratified middens at Cerro Juan Díaz were two tibia fragments.

A formal study is required in order to determine whether the peccary tusks in the Grave 1 necklaces belong to the collared (*Pecari tajaçu*) or white-lipped species (*Tayassu pecari*), or both. In the archaeofaunas of central Panama these American pigs are only proportionally significant in a small bone sample from a pre-village shelter occupied between 7000 and 2500 BP (Cueva de los Ladrones), which is located at the southern rim of the Coclé Pacific foothills north of Sitio Conte (Cooke *et al.* 2007, 2008). This suggests that peccaries may have been scarce on the landscape around Sitio Conte at the time it was used as a mortuary precinct. Therefore, it is possible that the peccary tusks used for the necklaces were not obtained in the vicinity of this site. At Spanish contact the chiefdom in which Sitio Conte was located (that of Natá) stretched as far inland as the central cordillera, about 25 km distant, where forest cover is likely to have been more extensive than in the coastal plains (Helms 1979, fig. 6). Perhaps treks into these mountain forests with packs of dogs were required to hunt peccaries successfully and bring their meat and/or displayable remains back to the site.

An alternative explanation is that the peccary tusk necklaces represent scarce or special traded items that have nothing to do with hunting! In this case the significance of the paraphernalia buried in Grave 1 could be ceremonial or ritual, the bone-decorated garments and necklaces being part of a shaman's or other specialist's attire, and the shark-teeth and sting-ray spines materials for blood-letting, a ritual activity which many archaeologists believe explains the frequent finds of intact sting-ray spines in New World archaeological features (De Borhegyi 1961; Joralemon 1974; cf. Haines *et al.* 2008). Cooke (2004b) discussed this possibility with reference to an adolescent buried with sting-ray spines and stemmed chalcedony blades at Panamá Viejo, a site located 200 km to the east of Sitio Conte. Some kind of ritual use for ray spines is also suggested by Cache 26 at Sitio Conte ("caches" in Lothrop's terminology are groups of artefacts intentionally buried together without human remains). Lothrop's team found evidence for activities using fire in this feature: forty-six pottery incense burners were associated with sting-ray spines, sawfish rostral spikes, bone "arrows" and about 24 *Oliva* shells (Lothrop 1937, 290).

A rich bone carver lineage?

A striking category of bone artefacts found at Sitio Conte is a set of carvings, which according to Lothrop made use of "large animal" bones or "deer vertebrae." All sixteen examples were found in a single grave (32) assigned by Briggs to his top-ranked Cluster 1 (Briggs 1989; Lothrop 1937; Cooke 2004b, fig. 4a–e). Pottery typology shows that this grave and nearby Grave 1, which we discussed above, are among the earliest at Sitio Conte: they contain Cubitá style pottery dated to cal 550–750 CE (Sánchez and Cooke 2000). Lothrop proposed that Grave 32 was used twice for single interments and once for a group of five individuals. Traces of bark cloth identified over the bodies were capped with a layer of fish bones, sting-ray spines and sawfish rostral teeth. In addition to the carved mammal vertebrae, the archaeologists recorded 1) seven bone awls, 2) fragments of six objects interpreted as spear-thrower guards (Cooke

2004b, fig. 4j–l), 3) a carved cylindrical box, and 4) at least eight carved whale teeth and/or manatee ribs (one with gold overlay), 5) several other carved bone items, and 6) groups of perforated and unperforated mammal and shark teeth.

Carved bone objects occurred in greater quantity in Grave 32 than in any other at Sitio Conte. Some of these represent unique artefact categories. Some objects, such as the carved vertebrae, the bone box and spear-thrower guards, exhibit unusual crafting skills. The interments are all adult males. The grave was used three times. These features suggest that a special occupation is being advertised by the display of funerary arts: this vault perhaps belonged to a lineage of specialist bone carvers, whose skill enabled them to amass large numbers of fine gold objects acquired in exchange.

In sum, the associations between animal-derived objects, other kinds of mortuary goods and individuals in those graves considered to belong to the highest ranked or wealthiest people at Sitio Conte, according to Briggs' (1989) criteria, provide several insights into how 'Gran Coclé' society was structured and about how these people perceived their relations with and relatedness to animals. On the one hand, it is possible that the large numbers of sting-ray spines and bone and stone points, as well as the presence of carved spear-throwers, are pointing towards a link between military prowess and high ranked males, as many Spanish chronicles suggest and as some modern analysts advocate (*e.g.*, Linares 1977). On the other hand, these data also admit the interpretation that occupation, or specially developed skills in a particular occupation such as hunting dangerous or difficult-to-acquire animals or producing exquisite bone carvings, enabled men to acquire prestige, and accumulate and advertise wealth. Unfortunately, there is no evidence for workshops at Sitio Conte so we do not know whether the purported bone-carver lineage lived in or near this site. The only field evidence for the manufacture of bone artefacts in 'Gran Coclé' comes from Cerro Juan Díaz where a workshop used for making both shell and bone artefacts was discovered recently by Mayo (2004; Mayo and Cooke 2005). This feature dates to the period cal 550–750 CE and thus is slightly earlier than most of the Sitio Conte graves.

The ceremonial use of fossil shark teeth (sometimes painted) and an alternative *ritual* function for sting-ray spines raise the possibility that objects such as bone aprons and shirts and animal tooth necklaces may have formed part of ceremonial attire associated with shamanism or curing rather than with fighting or hunting. The contact-period chroniclers' frequent mention of curer-magicians ("hechiceros") as well as their observations that these "*tequinas*" enjoyed a special position in Panamanian pre-Columbian society provides documentary support for this proposition (Andagoya in Jopling 1994, 29; Fernández de Oviedo 1853, 126, 129, 159). So does evidence from two graves at Cerro Juan Díaz (at an earlier time level) for the display of big cat teeth and skillfully crafted marine shell, gold and stone artefacts, perhaps used together on single garments to which we will refer below.

Low status people and animals

At Sitio Conte several graves were of a modest nature, containing the remains of single individuals buried with no or few artefacts belonging to a small number of object categories. Similar simple interments characterize a small sector of the 100 ha Cerro Juan Díaz site, which was reserved for burials at about the time that Sitio Conte was a functioning cemetery (Cooke *et al.* 2000; Díaz 1999; Sánchez 1995). Located on the southern edge of a 50 m high hill that dominates the site, this precinct appears to have been intentionally levelled (Isaza-Aizuprúa 2007). Mortuary practices are complex: primary flexed and extended burials, secondary burials in packages, cremated remains, isolated body parts (such as crania), burials in urns and ossuaries, are all represented. More than one way of disposing of the dead was often observed in a single grave. Some of the graves received individuals or groups of individuals, and groups of bodies prepared in different ways, on different occasions. When present, grave goods were low in number and variety: clay vessels; polished stone axes and polishing stones; chalcedony tools; bone and antler tools; bone, stone and shell pendants and beads; and necklaces made of a variety of small objects (shell, teeth, bone and/or gold-copper alloy), sometimes used singly and sometimes in various combinations. The maximum number of clay vessels recorded in a single interment was 30 (Operation 4, Feature 51, Individual 98). Only three interments possessed gold articles: one adult woman with an estimated age of 40–45 was buried with 14 cast and hammered gold beads and two polychrome vessels (Cooke 2001; Díaz 1999, Table 3.2). A sub-adult whose age was estimated at 3 years ± 12 months was buried with a necklace of five gold beads and three shell pendants. (The third metal artefact was a small disk fragment found in an ossuary).

Notwithstanding the paucity of the mortuary arts, however, there is evidence for social hierarchy within this grave group. In one case the largest and deepest grave ("Rasgo 4", a 3 m deep tomb cut through bedrock, that was reused many times) was encircled by much shallower graves containing primary extended burials, most of which were devoid of funerary arts (Cooke 2001; Díaz 1999). As we pointed out above, Díaz's (1999) preliminary analysis of the distribution of human remains by age and sex differs considerably from the pattern observed at Sitio Conte: more adult women than men and many more sub-adults (including children) were buried at Cerro Juan Díaz. Since many graves include secondarily prepared individuals and urn burials, it has been extremely difficult to assign artefact numbers and classes to individuals. The aging and sexing of skeletons is not yet complete. Even so, we offer some generalizations about the use of animal-derived tools and costume items (Table 3.2).

A notable feature of this particular mortuary sample at Cerro Juan Díaz is the presence of shell beads and pendants, which were recorded rarely at Sitio Conte, and only in caches and low-rank graves. At Cerro Juan Díaz, 31 (49%) of a total of 63 mortuary features belonging to the 750–950 CE period, contained shell artefacts. But a total of only 247

	Total number of items of artefact class found in burial ground	Number of features recording artefact class (percentage)	Maximum no. of items of artefact class in a single feature	Maximum no. of items of artefact class attributable to a single ornament (i.e., necklace)
Shell bead or pendant	247	31 (49%)	47	44
Perforated shark vertebra	26	12 (19%)	12	2
Perforated or intentionally polished shark tooth	11	7 (11)	2	2
Tool made of teleost bone	2	2 (3%)	1	1
Sawfish (*Pristis*) rostral tooth	6	4 (6%)	3	?
Iguanin lizard long bone bead	4	4 (6%)	1	1
Perforated cayman (*Caiman*) tooth	1	1(2%)	1	1
Bird bone bead	5	4 (6%)	2	2
Osprey (*Pandion haliaetus*) claw	2	1(2%)	2	2
Trapezoidal pendant of mammal bone	9	4 (6%)	3	3
Agouti (*Dasyprocta*) tooth used as tool	3	3 (5%)	1	1
Perforated mammal tooth	1	1 (2%)	1	1
Perforated carnivore tooth	3	2 (3%)	2	2
Perforated raccoon (*Procyon lotor*) tooth	3	1(2%)	3	3
Perforated tayra (*Eira*) tooth	1	1(2%)	1	1
Perforated dog (*Canis*) tooth	31	8 (13%)	22	22
Perforated *Homo sapiens* tooth	10	7 (11%)	7	7
Perforated puma or jaguar tooth	1	1(2%)	1	1
Perforated deer (*Odocoileus*) tooth	20	3 (5%)	18	18
Deer bone and antler tool	10	9 (14%)	2	0

Table 3.2: Distribution of animal-derived artefacts in 63 mortuary features at Cerro Juan Díaz (Operation 4).

beads was recovered (all feature fills were water-sieved through 1/16 inch, 1.7 mm wire meshes). The maximum number of shell artefacts attributable to a single string was 47. The identification of the shells is not yet complete; but, preliminary analysis suggests that the following genera and species were used for making costume items: Gastropoda: cowrie (*Jenneria*), olive shell (*Oliva*), dwarf olive shell (*Olivella*), spotted margin shell (*Persicola*), and auger snail (*Terebra*); Pelecypoda: mule's hoof cockle (*Anadara grandis*), pearl oyster (*Pinctada maztlanica*), rock scallop (*Spondylus calcifer*) and thorny oyster (*S. princeps*).

A similar pattern of modest usage is apparent in the sample of ornaments and tools made out of vertebrate bones and teeth. One hundred and forty-nine articles of worked bone and teeth were present in 26 of the 63 mortuary features (41%). Most of the items were found isolated or in pairs. The exception is a cluster of artefacts, associated with an adult who has not yet been sexed (Feature 41, Operation 3). It comprised the following items, found near the feet: 1) 22 perforated domesticated dog (*Canis lupus familiaris*) canines, 2) three perforated raccoon (*Procyon lotor*) canines, 3) two perforated probable bull shark (*Carcharhinus* cf. *leucas*) teeth, 4) two perforated carnivore teeth, 5) one unidentified perforated mammal tooth, 6) one perforated tayra (*Eira barbara*) canine, 7) one jaguar (*Panthera onca*) or puma (*Puma concolor*) split molar, 8) 16 pendants made out of pieces of mule's hoof cockle (*Anadara grandis*), 9) 13 large beads of pearl oyster (*Pinctada mazatlanica*) and 10) one small bead of *Spondylus* shell. (In Cooke 2004b, Fig. 3.8, one tooth in the above group was identified as "howler monkey" (*Alouatta* sp.); this is an egregious mistake for which we accept responsibility. It is, in fact, the split molar of a large felid, probably jaguar or puma!). It is possible, of course, that this probable necklace or apron of animal materials is 'special' vis-à-vis the goods owned by this low status population, *i.e.* that it is a modest version of the much more elaborate necklaces or aprons found in earlier Cerro Juan Díaz graves and in Graves 1 and 32 at Sitio Conte. Conceivably it belonged to a person engaged in ritual activities *within this social group*.

To sum up, the people whose mortal remains were buried at Cerro Juan Díaz during the period 750–950 CE generally had very few belongings and owned very few sumptuary or costume items. It is interesting, nonetheless, that these low status people used many of the animals and animal-derived materials that were recorded in the richest graves at Sitio Conte, but in much smaller quantities: perforated shark teeth and vertebrae; bird bone tubes, beads and claws; polished sawfish rostral teeth; perforated dog and other carnivore teeth; perforated human teeth; and large tubes made of deer long bones (Fig. 3.6h). Missing in this and other grave groups at Cerro Juan Díaz are the superbly carved items that distinguish the elite at Sitio Conte, as well as materials that we have proposed were scarce and/or obtained from far away, such as sperm whale teeth, manatee bone and

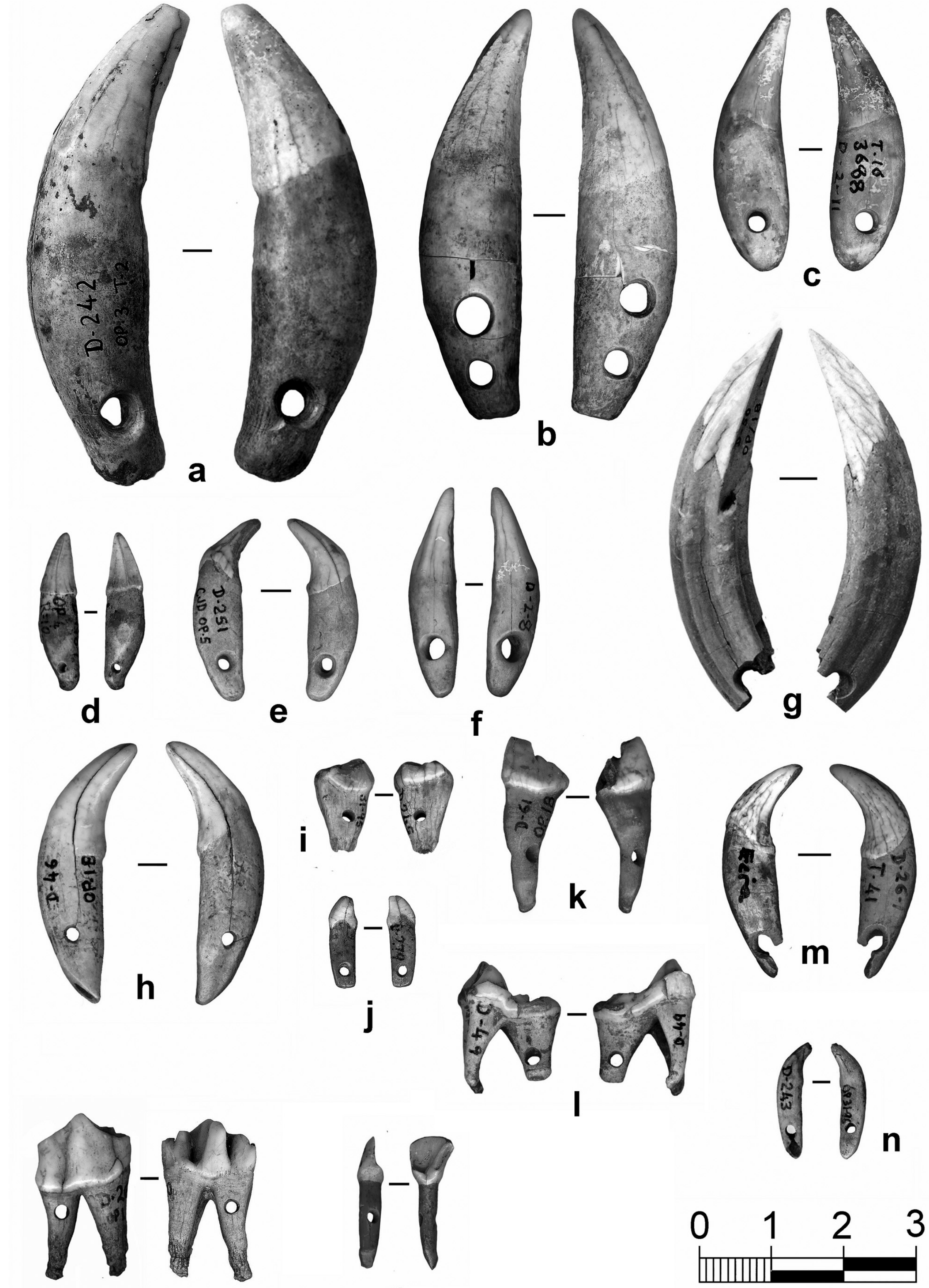

Figure 3.8. Perforated mammal teeth from Cerro Juan Díaz, Panama. a: Panthera onca, right maxillary canine, Operation 3, grave (F. 2), b: Puma concolor, right maxillary canine, Operation 3, grave (F.16), c: Leopardus pardalis, left maxillary canine, Operation 3, grave (T.16), d: Puma yagouaroundi, right maxillary canine, Operation 4, grave (F.10), e: Lutra, right mandibular canine, Operation 5, f: Procyon lotor, left maxillary canine, Operation 3, grave (F.16), g: Tayassu cf. tajacu, left mandibular tusk, Operation 1, refuse deposit, h–l: Canis lupus familiaris (h: left mandibular canine, Operation 1, refuse deposit, i: left mandibular molar 1, split, Operation 31, refuse deposit, j: incisor, Operation 5, refuse deposit, k: left mandibular molar, split, refuse deposit, l: right molar, Operation B, refuse deposit). m: Eira barbara, Operation 3, grave (F.41), n: Urocyon cinereoargenteus, right mandibular canine, Operation 31, refuse deposit, o–p: Odocoileus virginianus (o: 3rd. right mandibular premolar, Operation 1, refuse deposit, p: first right incisor, Operation 3, grave [F. 41]). (Photos: R. Cooke).

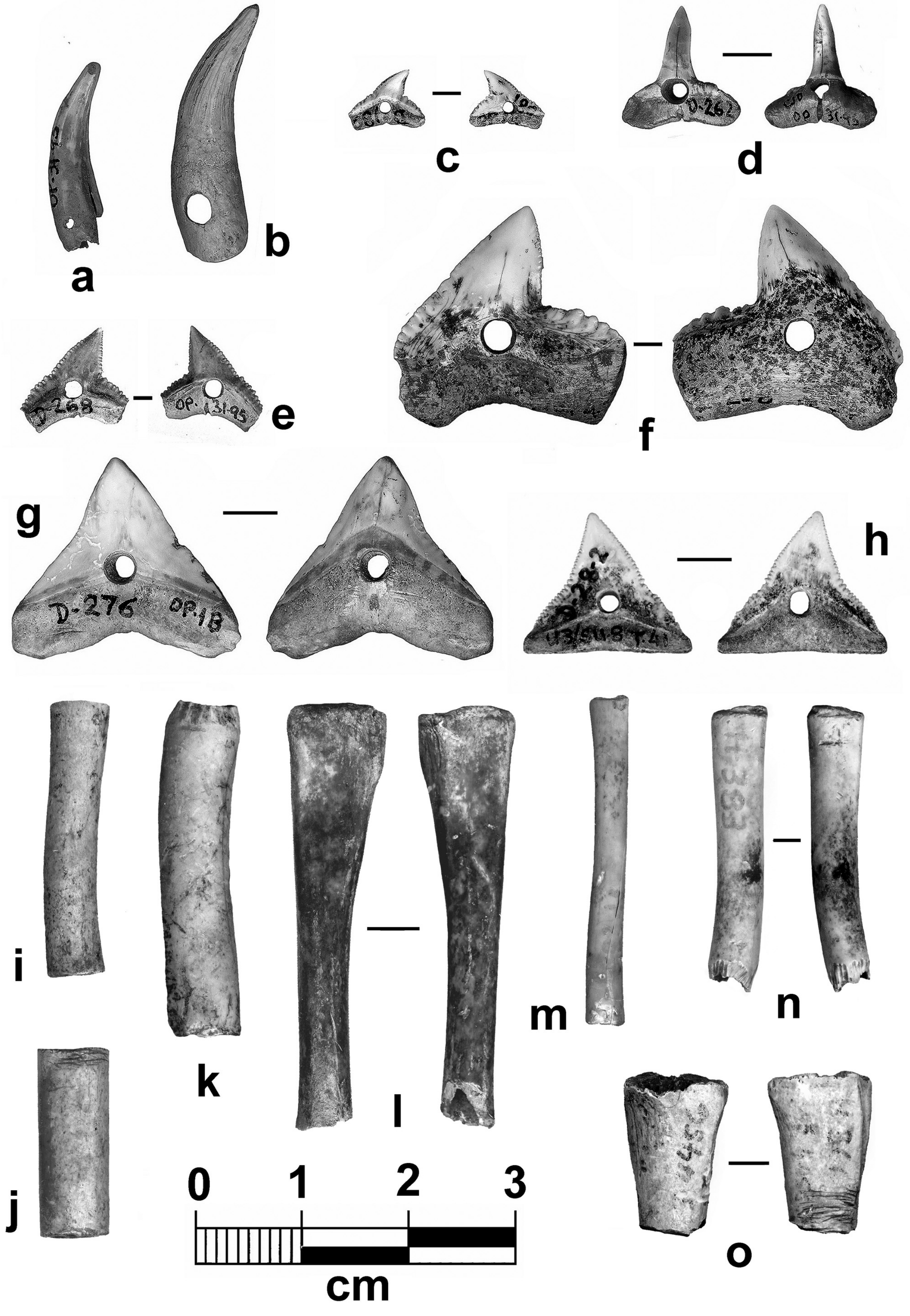

Figure 3.9. Perforated crocodilian and shark teeth and modified iguana bone from Cerro Juan Díaz. a: Crocodylus, Operation 31, refuse deposit, b: Caiman, Operation 8, refuse deposit, c: Carcharhinus cf. limbatus, Operation 4, grave (F.51), d: Carcharhinus cf. limbatus, Operation 4, grave (F.24), e: Carcharhinus leucas, Operation 31, grave (F.16), f: Galeocerdo cuvier, Operation 4, grave (F.54), g: Carcharhinus leucas, Operation 1, refuse deposit, h: Carcharhinus leucas, Operation 3, grave (F.41), i–o: Iguana iguana (i: left femur, Operation 5, refuse deposit, j: tibia, Operation 31, pit fill, k: right femur, Operation 31, refuse deposit, l: right tibia, burnt and polished, Operation 3, pit fill, m: right fibula, Operation 3, grave (F.77), n: right femur, Operation 3, refuse deposit, o: right tibia, Operation 1, refuse deposit). (Photos: R. Cooke).

perforated peccary tusks. On the other hand, small tubes made out of black and green iguanas (*Ctenosaura* sp. and *Iguana iguana*) (Fig. 3.9i–o) were reported at Cerro Juan Díaz, but not at Sitio Conte. One can imagine that people living at the former settlement wore little amulets or charms, and small strings of necklaces, bracelets and ankle ornaments while they went on their daily rounds just as contemporary Native Americans still do at villages across the isthmus. In fact, several animal-derived artefact classes that were not recorded in burial features at Cerro Juan Díaz showed up in middens and pit fills: 1) dog and big cat paw parts (which we believe were used as charms or amulets), 2) sting-ray spines, and 3) the perforated teeth of crocodilians (*Cocodrilus, Caiman*), otter (*Lutra*), jaguarundi (*Puma yagouaroundi*), grey fox (*Urocyon cinereoargenteus*), and a single peccary (*Tayassu*) (Figs. 3.8 and 3.9). Since some of these artefacts are unfinished, including big cat metapodial tubes that we mentioned above (Fig. 3.6a–c), they must have been manufactured on site. The large number of broken or unfinished bone objects found in the shell-bead workshop described by Julia Mayo (2004; Mayo and Cooke 2005) suggests that the craftspeople who worked in this part of the site were skilled at carving both kinds of materials.

Animal images

Iconographic studies demonstrate that particular animals or anthropomorphized animals were depicted across the ‘Gran Coclé’ culture area on objects, which would probably have been ranked alternatively at the top and bottom of the value scale in this region of pre-Columbian Panama. For example, the standing humanized crocodile figure is shown in a very elaborate fashion on gold-copper patens or disks – a clear symbol of elite status at Sitio Conte – replicating design details that occur also on fine polychrome pottery (Fig. 3.10a, b). Cooke (1998) argued that, thus depicted, these figures don the apparel of high rank, *i.e.* bead belts and necklaces, elongate ear ornaments and (probably) feathered head ornaments. At Cerro Juan Díaz, a small tube of vertebrate bone found in a refuse lens is crudely but effectively incised with an image which has the hall-marks of the same mythical creature (Fig. 3.10c). Thus, it seems that the humanized crocodilian image was significant to high and low status peoples alike suggesting that it referred to a mythological or historical personage (perhaps with genealogical connotations), which represented a social group that venerated the deeds of humanized crocodiles who manifested themselves in natural and supernatural guises. Some of the superb whale tooth and manatee bone carved objects also depict a crocodilian in human form (Fig. 3.3a–c). At Cerro Juan Díaz someone tossed a very similar broken image into a refuse pile (Fig. 3.3d). But it was fashioned out of readily available deer antler, rather than scarce whale tooth ivory or manatee bone.

Earlier time periods at Cerro Juan Díaz

Although the mortuary precinct used between about 750 and 950 CE at Cerro Juan Díaz indicates that people of low station buried their dead here, in earlier periods there is evidence for a different situation. On the same flattened area of the hill-slope, a small group of graves cut through bedrock and stratified underneath a circular arrangement of stone-lined features (probably ovens) contained primary extended or secondary burials in packages, in which well-crafted gold and shell ornaments were found, the latter present in considerable numbers and exhibiting notable crafting skill. These burials date between 100 and 700 CE (on typological grounds, most probably 100–400 CE). About four hundred elongate *Spondylus* beads, 25 perforated jaguar and puma canine teeth, two pottery incense burners, and two hammered gold plaques with diverging spirals were found in one grave (Feature 1 of Operation 3). The owner was identified as an adult male. Earlier reports have suggested that he was a curer, chanter or shaman who used these objects for special activities. In a nearby grave in the same group (Feature 16), several secondary burials in packages were crammed into a cylindrical shaft. A group of adult and children’s bones deposited together was associated with two polished stone bars of exquisite workmanship, several *Spondylus* and *Pinctada* ornaments, and a cluster of perforated puma, ocelot (*Leopardus pardalis*) and raccoon canines – probably they all belonged to a single necklace or apron (Fig. 3.8a–c; Cooke and Sánchez 1998; Cooke *et al.* 1998, 2000, 2003; Sánchez 1995).

The mortuary arts of these two interments at Cerro Juan Díaz do not approach the opulence of graves 1, 5, 26 and 32 at Sitio Conte, but they do suggest that certain individuals’ roles in this society were enhanced or advertised by special artefacts several centuries earlier than Sitio Conte’s apogee, raising the question whether religious activities *sensu lato* were the initial stimuli for subsequent wealth differentiation. Another implication is that large cats were important components of ritual behaviour and attire for some people and in some places across the region (Cooke 1998, 2004 b). An interesting question for future research is to verify whether the symbolic importance of jaguars, pumas and ocelots declined through time or whether this supposition is a consequence of incomplete sampling and/or archaeozoological research (*i.e.* that felid materials remain unidentified in the copious Sitio Conte collections).

Fish, iguanas and deer: ritual foods or regular fare?

In our introduction we mentioned that the Spanish soldiers who invaded the Parita Bay chiefdoms in the second decade of the sixteenth century CE were invariably greeted by chieftains seated on wooden stools with food offerings of a toothsome triad: fish, iguanas and deer (Fig. 3.2). Does this imply that special kinds of foods were reserved for high status people?

Archaeozoological data (summarized in Cooke *et al.* 2008; Cooke and Jiménez 2004; Cooke and Ranere 1999; Jiménez and Cooke 2001) indicate that marine fish were

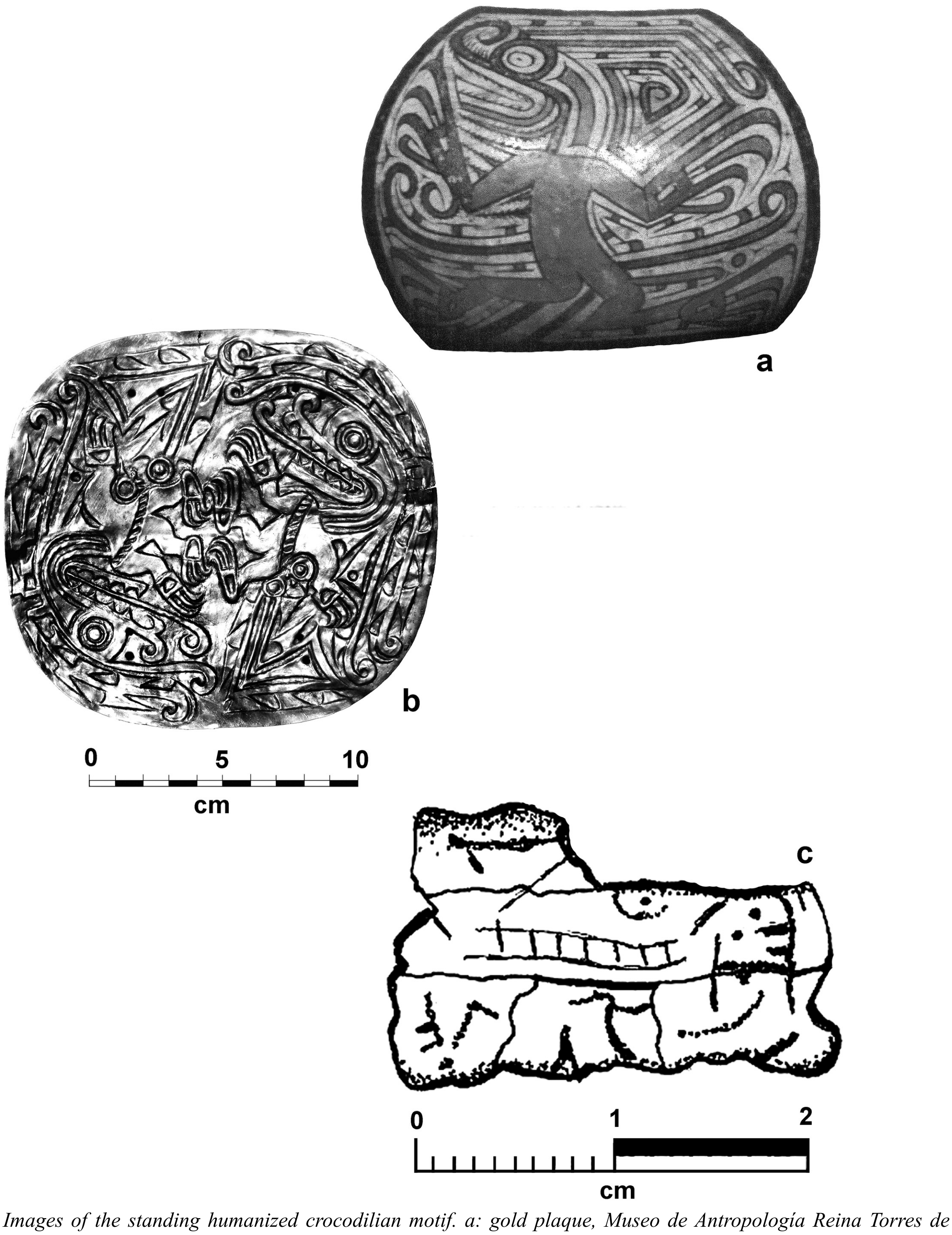

Figure 3.10. Images of the standing humanized crocodilian motif. a: gold plaque, Museo de Antropología Reina Torres de Araúz, Panamá, unprovenienced, b: Macaracas polychrome vessel, Museo de Antropología Reina Torres de Araúz, Panamá, unprovenienced, c: bone tube, Cerro Juan Díaz, Operation 31, refuse lens. (Photos: R. Cooke, drawing: Paula Figueroa).

widely consumed around Parita Bay throughout the pre-Columbian period in proportions that predictably diminish the further one goes from the coast. Even so at Sitio Sierra – a farming village located along a freshwater stretch of a major river (the Santa María) and 13 km from the sea – as much marine fish was consumed as meat from other vertebrates (Cooke *et al.*, 1996, 2008). This is to be expected in a region in which each chiefdom at Spanish contact comprised stretches of mangrove-estuary and rivers influenced by marine tides several kilometres inland (Cooke and Ranere 1992b). The location and archaeozoological components of some sites (*e.g.*, Monagrillo and Cueva de los Vampiros) indicate that these were genuine fishing camps or small villages at which small marine fish were caught and prepared (probably by salting and/or smoking) for inland consumption (Carvajal *et al.* 2008).

The two local species of large lizards, the black iguana (*Ctenosaura* aff. *similis*) and the green iguana (*Iguana iguana*), occur in midden samples dating from cal 6000 BCE to Spanish contact. They seem to have been available to everybody. Their co-occurrence at specific sites is closely linked to the habitat mosaic of the region, the fossorial and littoral black species being proportionally more abundant than the more arboreal green species the nearer the sites were to the active marine shore (Cooke and Ranere 1989, 1992a; Cooke *et al*. 2007, 2008).

Archaeozoological data (most recently summarized in Cooke *et al*. 2007, 2008) also show that from cal 6000 BCE until conquest, white-tailed deer were the target mammal species around Parita Bay, so much so, in fact, that we have proposed that the sheer abundance of this species would have diminished the importance of other mammals in the hunting rounds (Cooke 1992; Cooke and Ranere 1992a). Since we have no information about human faunal use before 6000 BCE, we cannot determine whether this deer species was a prominent component of the regional fauna prior to continual human hunting pressure or whether it became abundant because agricultural activities and forest removal provided the most appropriate habitat for it. Deer provided primary materials as well as meat: antlers, teeth and bones were used for making a wide variety of artefacts, ranging from tooth necklaces and bone aprons, to polishing tools (perhaps for leather work), projectile points, possible maize de-grainers, whistles, and plugs (Fig. 3.6d–h, Fig. 3.8o, p; Cooke 2004b, fig. 8 a, b, and h). White-tailed deer images with branching antlers were commonly depicted on polychrome pottery across the 'Gran Coclé' culture area (Fig. 3.2d; Cooke 2004a, fig.1c).

The "300" jerked carcasses witnessed by Captain de Espinosa in the dispensaries of the chieftain of Natá suggest that deer meat was being accumulated for some social event, such as a feast (in Jopling 1994, 48, 55). This observation contrasts with another comment made by the same captain who averred that the high ranked people of this chiefdom – the words he uses are "*cacique e indios principales*" ("the chief and principal men") – were not allowed to eat meat "of any kind whatsoever, except fish and iguanas" even though there were "deer and other kinds of game all over the place" (in Jopling 1994, 48, 55, 65). Pascual de Andagoya, a soldier who accompanied Captain de Espinosa, mentions that the "lords" ("*señores*") had hunting grounds where they went to hunt deer. Andagoya's comment is not specific about geography. Nevertheless, these two eye-witness observations imply that: 1) hunting was socially regulated in some way, 2) elites were not allowed to eat meat at some time(s), and 3) deer populations were marshalled on the landscape.

Spanish contact-period chroniclers assert that some chieftains' residences were larger than those of the rest of the population as well as being more finely embellished and having more rooms although it is possible that they confused communal buildings, such as congress houses akin to those of the present-day Kuna, with elite residences (*e.g.*, Fernández de Oviedo 1853, 131, Mártir de Anglería 1965, 310, 378). But archaeologists have not yet confirmed this kind of residential differentiation in 'Gran Coclé'. Although a few pre-Columbian archaeological features have been interpreted as dwellings at sites bordering Parita and Panama bays (summarized in Cooke and Sánchez 2004), all appear to be modest, single-roomed structures. Undoubtedly, it would have been politically advantageous to monitor or manage deer-hunting temporally or spatially to ensure the availability of meat for important social occasions. We suspect that Espinosa and Andagoya described short-term prohibitions that were ecologically practical and socially meaningful in the ancient anthropogenic savannas of central Panama where large human populations encroaching frequently upon each other would surely have exerted considerable pressure on deer.

Pretty birds, status and distance

A noteworthy feature of vertebrate bone samples acquired at Cerro Juan Díaz is the number and variety of bird remains (Cooke *et al.* 2007, 2008). A quite diverse avifauna was also reported at Sitio Sierra, a site located between Sitio Conte and Cerro Juan Díaz (Cooke 1984; Cooke and Ranere 1992a). In some sectors of Cerro Juan Díaz concentrations of bones belonging to species such as the American egret (*Ardea* [or *Egretta*] *alba*), parakeets (*Aratinga* and *Brotogeris*) and macaws (*Ara*) were observed. Several groups of bird bones were found in and around burials or ritual features suggesting that whole or partial (perhaps desiccated) birds had been intentionally deposited. These include the remains of colourful passerines, such as the rose-breasted grosbeak (*Pheucticus ludovicianus*) and large yellow-bellied flycatchers (*Pitangus sulphuratus* and *Megarhynchus pitangua*).

Feathers from brightly coloured birds have been, and still are, important correlates of status and/or occupation all over the New World tropics. Several cast gold figurines in human guise that were produced in Panama or neighbouring areas sport headdresses. Dancing figures hold rattles shaped like birds (Cooke 1984). Anthropomorphic figures of crocodilian men appear to wear feathered capes (Cooke 2004a, fig. 9c). Fernández de Oviedo (1853, 130) noticed that high ranking men in the Cueva polity (who inhabited Panama to the east of Parita Bay) were "men of experience in matters of the arms they use, and they go out with *their feathered topknots*, (their bodies) coloured red with anatto or painted black with *Genipa*, and they wear insignias so they will be identified in battles" (translation and emphasis ours).

At Sitio Sierra an unusually small adult male was found buried with a pelican bone flute, a shiny greenstone (probably sericite) necklace and the partial skeleton of a scarlet macaw (*Ara macao*) (Cooke 1984, 2004a). This is a low status burial ground.

The Spanish troops who invaded these chiefdoms saw several kinds of birds being kept in cages. Geographer

Carl Sauer (1966) was surely right when he attributed the "pheasants" to cracid birds like chachalacas (*Ortalis*) and guans (*Penelope*), and the "geese" to the Muscovy duck whose domesticated form has been identified at Sitio Sierra (Cooke *et al.* 1996; see also Stahl 2005). Some crested guan and duck bones found at Cerro Juan Díaz and Sitio Sierra are from very young birds, which may have been raised in captivity. But apart from a reference to "papagallos" in the chiefdom of Chirú (Espinosa in Jopling 1994, 47) the contact-period chronicles are mute about species that would have been kept for their plumage, behaviour, or vocalizations rather than for food. One assumes that the same principle applied to bird materials as it did to other animal-derived products in this "value-added" system (Briggs 1989): the largest numbers of feathers and those obtained from the most colourful, behaviourally idiosyncratic or exotic species were reserved for people with special occupations or a special status. If the small individual of low station buried at Sitio Sierra owned one scarlet macaw, powerful curer-magicians may have owned dozens.

Pretty birds like macaws, parrots and parakeets, just as peccary tusks and jaguar teeth, are logical contenders for relatively long-distance transport in the geographical area that concerns us. For distance to be meaningful, however, it has to be *measured*. At Cerro Juan Díaz, macaw (*Ara*) bones are the most abundant bird remains at the genus level. It is very difficult to identify macaw bones to species; but a preliminary analysis undertaken at the University of Florida Museum of Natural History, under the guidance of David Steadman, suggests that the scarlet macaw and blue-and-yellow macaw (*A. araucana*) are present in this sample. On ecological grounds the scarlet species is likely to have been the most abundant macaw in the seasonally dry parts of Panama before human intervention. But no macaw species are present today in the lowlands adjacent to Parita Bay, and we are ignorant of historic records for them. Finsch's parakeet (*Aratinga finschi*) whose bones were also recorded at Cerro Juan Díaz is no longer found in the study region. Nonetheless, although it is possible that some psittacid species were not obtained locally by pre-Columbian people, we advocate prudence. The same applies to other animal species. Intuitively, one might think that puma canines came from afar because the long-term anthropogenic effects on the local vegetation would have driven the small populations of big cats to the peripheries. Puma, though, are natural predators of white-tailed deer. So deer abundance may have had a positive effect on the pre-Columbian abundance of puma.

Cerro Juan Díaz is located at the southern edge of a mangrove-fringed tidal estuary. This is *not* the appropriate habitat for *Spondylus* and booby birds (*Sula*) whose shells and bones were frequently made into personal costume items. Our initial evaluations of these materials appealed to long-distance transport to explain their presence at this archaeological site (Cooke 1998). A mere 12 km as the crow flies from Cerro Juan Díaz, however, lies a rocky islet a quick boat ride from the shore (Isla la Villa). Blue-footed boobies (*S. nebouxii*) used to breed on this islet (Olson 1997). A *Spondylus* ash-tray in a local bar alerted us to the fact that a small population of these shells still exists on the islet. It now seems likely that this insignificant feature of the landscape was the source for at least some of the *Spondylus* and booby materials that were used to make costume items for the inhabitants of the Parita Bay chiefdoms.

Conclusion

The four small chiefdoms whose territories fringed Parita Bay in the early 1500s CE were ruled by chiefs who may have been drawn from high ranked clans. Their power and influence were strongly contingent upon their personal prowess, which was advertised in life and death by the accumulation of large (sometimes impressive) quantities of costume and sumptuary items including articles that used vertebrate products, such as bone, teeth, ivory, antlers and, probably, perishable goods that generally do not appear in the archaeological record in the humid tropics, *i.e.* leather, skins and feathers. The regional art style is characterized by a semiotic component that made use of knowledge about the local fauna and the behaviour of its component species. Although artists often depicted fantastic animals they also took the trouble to highlight anatomical features that relate images unequivocally to real species (Cooke 1984, 1998, 2004a; Helms 1977, 1995, 2000; Linares 1977).

The best way to address rank and status with archaeological materials is to study mortuary arts and behaviour. It is clear that the relation between funerary accoutrements and human individuals in the sample of animal-derived artefacts that we have considered reflects not only the social station of the deceased, but also age, sex and occupation to varying degrees (Briggs 1989, 62–63). It is also apparent that the Sitio Conte burial ground used between about 700 and 1000 CE is the exception rather than the rule in the 'Gran Coclé' culture area. It was the place where the richest males were laid to rest, perhaps not just from the small chiefdom to which Sitio Conte ostensibly would have belonged, but from a much larger territory comprising various chiefdoms united by common ancestry and traditions in spite of the constant tension among them (Cooke *et al.* 2003).

Evidence for an exclusive relationship between particular animal *species* and highest social rank is not striking although certain materials, such as whale tooth ivory and manatee bone, do seem to have been reserved for elite males. There may also be a relationship between turtles and high rank although we cannot say on the basis of available data whether terrestrial or marine species were responsible for the large numbers of whole carapaces deposited mostly in elite graves at Sitio Conte. Excluding the above animals, rich or influential people in the Parita Bay chiefdoms used materials from the same species as folk of lower status, but in considerably greater numbers. Whereas a lowly person might own one or two shark teeth pendants, dog paw danglers, puma metapodial tubes or bird claws, influential adult males used scores or even hundreds of such items. The only animal-derived objects, which are present in low status graves at Cerro Juan Díaz, but absent from Sitio Conte's elite interments, are small tubes made of iguanin lizard long bones; but a detailed analysis of materials recovered at the latter site might change this situation.

Felid materials appear to be rare at Sitio Conte and their images are also infrequent in the regional art style (Cooke 1998). But between about 100 and 700 CE there is evidence for use of big cat teeth on artefacts that allude to a link with special male activities (*e.g.*, shamans, curers and chanters), which may have been relevant hierarchically. Although spotted cats may have been scarce in the ancient anthropogenic savannas around Parita Bay we have warned that in these times of white-tailed deer abundance, pumas were probably commoner than they are today, and easier to find in these chiefdom's territories than, say, jaguars.

The fact that several adult males were buried in the same graves (1 and 32 at Sitio Conte), which were used more than once, suggests that we are dealing with trans-generational occupational specialization. We have suggested that two possibilities are hunting with packs of specially trained dogs (Grave 1) and crafting bone objects (Grave 32). We also proposed that sting-ray spines and shark teeth, which were amassed in large numbers by some elite personages, could have been either components of weaponry (as the Spanish chronicles infer) or ritual items for activities such as blood-letting.

A formal metric evaluation of Parita Bay dog teeth has not yet been undertaken. The dimensions of some canines and molars suggest that local animals were not all the little yappy dogs (*gozques*) that Spanish chronicler Fernández de Oviedo (1849, 390) disparaged in the West Indies. According to Juliet Clutton-Brock teeth found in graves on south of the Azuero Peninsula resemble those of Anglo-Saxon long-faced (greyhound-like) and short-faced (terrier-like) breeds (Ichon 1980). Cooke compared the most ancient canid post-cranial element yet found in the area (a humerus from Cerro Mangote, probable age 6000 uncalibrated radiocarbon years) with skeletons in the National Museum of Natural History in Washington D.C. With a length of 107 mm and a gracile diaphysis, it corresponded closest to the larger breeds of collie (Cooke and Ranere 1989). If the residents of Parita Bay chiefdoms were not eating dogs, it is likely they kept them as guard and hunting dogs. Modern hunters in this part of Panama pursue peccaries in now distant forests with packs of dogs. Therefore, the number of dogs a person owned was likely to have been a symbol of prestige.

There is *pictorial* evidence for the crocodile's being a symbolically important animal, one which is often humanized. But rather than being an absolute symbol of rank and status, we have proposed (Cooke 1998, 2004a) that it was an ethnic or group symbol meaningful to rich and poor alike, and provide additional support for this supposition in this chapter. There is as yet no record for whole crocodiles or crocodile body parts being buried alongside high status people as they were in the Aztec and Maya worlds (Harrison, 1999: 83–86; Matos-Moctezuma 1988: 87–88, 116–119). Finds at Cerro Juan Díaz suggest occasional use of perforated crocodile teeth, mostly from small individuals, as danglers or amulets by low status people (Fig. 3.9a, b).

Macaws, parakeets, and other colourful birds also seem to have played a ceremonial role, either exhibited live or for their feathers. Macaw feathers are still used in (Christianized) religious ceremonies on the Azuero peninsula and may be a pre-Columbian influence. The distribution of macaw and other colourful bird remains at Cerro Juan Díaz suggests that they may have been kept in cages in special places.

Although there is ample documentary evidence for offerings of three kinds of food (fish, iguana, and deer) to important people embodied by the Spanish invaders, everybody seems to have had access to these victuals in the Parita Bay chiefdoms. Eyewitness observations of two Spanish soldiers, however, allude to the possibility that hunting was regulated in some ways, perhaps by restricting access to deer by certain groups, at certain times of the year or, more likely, as preludes to important activities or events in order to guarantee supplies of meat. Controls of this nature may be one of the reasons why white-tailed deer remained abundant on the landscape in spite of intensive consumption as food and for materials over a 7000 year period. We hope that future research concentrating on residential features will cast light on the discrepancies between the ethnohistoric and archaezooological records.

We have pointed out elsewhere (*e.g.*, Cooke and Ranere 1989, 1992a; Cooke *et al.* 2007, 2008) that it is unclear whether the rarity or absence of some terrestrial animal species in Parita Bay archaeozoological samples, and their differential distribution on art objects and in mortuary and midden samples, are accurate measures of the real abundance and distribution of these species across a pre-Columbian landscape, which had been continually impacted by forest clearance and agricultural activities for several millennia or, alternatively, of their non-use or restricted utilization by humans for cultural reasons. For example, archaeozoological data suggest that crocodiles were not a major food source around Parita Bay in spite of their iconographic prominence. Whether this was because they were tabooed as food because they were venerated, were too dangerous to hunt, or rare, is an intriguing but unanswerable question. Coati (*Nasua nasua*) bones have not been unequivocally identified in any Parita Bay archaeofaunal samples. The only tapir (*Tapirus terrestris*) bone of which we have record is a perforated supra-occipital crest found by Lothrop at Sitio Conte (Cooke, personal observation, Peabody Museum colelctions, 2007). Neither species is present today in the study area. Monkeys are represented in the entire Parita Bay vertebrate faunal sample by only one element: a white-faced capuchin (*Cebus capucinus*) cervical vertebra found at Cerro Juan Díaz. But even in these days of chain saws and cattle ranching, howler monkeys and capuchins hang on in remnant dry forests around Parita Bay. Therefore, it is hard to believe that pre-Columbian hunters eradicated regional populations of monkeys.

These and other uncertainties underline the need for an *independent* (*i.e.* non-anthropogenic) control to help us mitigate the circularity of our current explanations for the history and composition of the vertebrate life assemblages that were used by pre-Columbian people around Parita Bay. But in late Holocene times no animal species present in the area would have eaten crocodiles, monkeys, coatis and tapirs and stored their bones in caves for the convenience of archaeozoologists! A more practical way of advancing our understanding of this research topic would be to conduct a detailed archaeozoological re-analysis of the copious animal materials from Sitio Conte, which are deposited at the Peabody Museum of Harvard University and the University of Pennsylvania Museum.

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4. Body Parts, Placements, and People in an Iron Age Town in Bulgaria

Sue Stallibrass

A preliminary study of animal bones from an Iron Age town in Bulgaria compares three archaeological contexts in an attempt to understand Who*? did* What*? in the past and* Why*? and* How*? they did it. The deposits comprise one surface layer and two clay-lined pits. Archaeological evidence from masonry structures, industrial waste and prolific coins and imports of ceramics demonstrate that the town was a place of commerce and long distance trade, and also a center for metalworking. Spatial organization indicates urban planning, and the town was densely occupied. With such a range of activities, archaeozoologists should expect the animal bones to reflect a similar degree of complexity. The dumping of bone refuse at the back of the town wall can be interpreted as rubbish clearance or territorial definition. In this instance, the content of the deposit is unremarkable, while the location may be significant. The deposits in two clay-lined pits combine restricted locations with selected contents, but while the structures of the pits are very similar, their contents are very different. One had butchered, cooked and defleshed remains of several sheep/goat carcasses in its basal deposit, while the other had a layer containing butchered but refitting bones from three lower legs of cattle. A new methodology uses surface color to investigate the deposition of articulated but defleshed body parts. The specific treatment and selection of cattle lower limbs has parallels in Western and Central Europe and is very different to the 'Olympian' style illustrated by archaeological deposits and literary references in nearby Greece. The possibility is raised that the observed different styles of treatment of animals and their remains may reflect differences in activities or belief systems, which may in turn relate to cultural or ethnic affiliations, but full treatment of this aspect is beyond the scope of this paper.*

Keywords: animal bones, scorching, color, Iron Age, Associated Bone Groups

Introduction

The paper uses some preliminary work on animal bones from an Iron Age town in Bulgaria to investigate past human behavior. It concentrates on the need to look for, and identify, different modes of deposition, and to consider these in relation to what people were doing, thinking, and feeling. The site provides a good challenge: architecture, artifacts, and written evidence all suggest that the site provided a range of social, economic, and ritual functions, and that a variety of people may have inhabited or visited the town. This period in Europe's prehistory has been described by Cunliffe (2008, 317) as 'States in collision: 500 –140 BC' due to the complex interactions of expanding empires, mobile warrior groups, and migrating refugees. Can we identify the people who created the animal bone deposits? This paper employs the Whodunnit model (Stallibrass 2007a) which uses a detective system to ask explicit questions about people's past behaviour.

The structured deposition of selected body parts ('Associated Bone Groups' or ABGs *sensu* Hill 1995) in Iron Age deposits in Europe has been noted by several animal bone specialists whose analyses provoked considerable debate in the 1980s and 1990s (Grant 1991, Lambot *et al.* 1996, Wilson 1992). At the time, processual archaeology was the principal paradigm, and the main arguments concentrated on distinguishing deliberate placement (viewed as sacred ritual) from routine discard behavior (viewed as secular functionalism). Currently, there is renewed interest in these (Morris this volume; 2010) and a greater awareness that this apparent dichotomy may be a construct of modern observers (Brück 1999).

The site

The animal bones were recovered by various international teams excavating at an Iron Age town in central Bulgaria

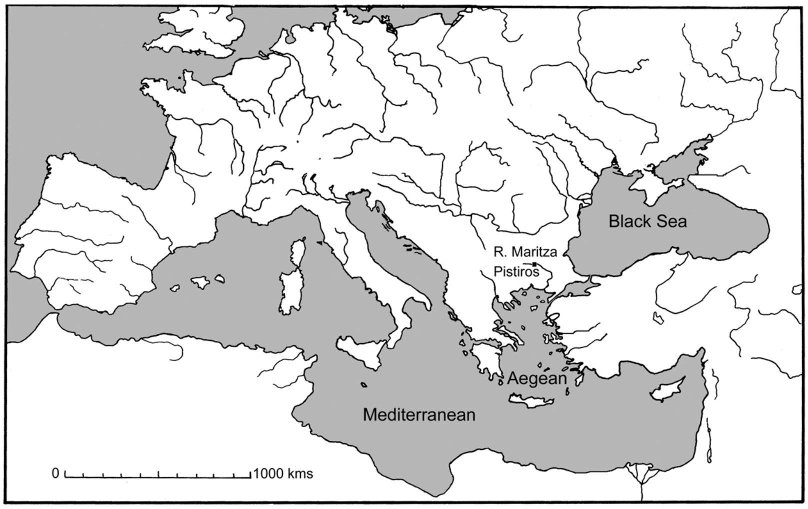

Figure 4.1. Location map of Pistiros (near Vetren in modern Bulgaria) on the Maritza River, which drains from the Thracian plain into the Aegean Sea.

(see Stallibrass 2007b). The town, near Vetren in the municipality of Septemvri, may be the Greek *emporion* 'Pistiros' mentioned in an inscription found nearby. It is located on the River Maritza, about 100 km upstream of Plovdiv (Philippopolis) and close to the western edge of the Plain of Thrace, which was ruled over by the Odrysian kings (Archibald 1998). North-south routes through mountain ranges cross the river here, which was navigable this far inland. Upstream to the west, a gorge has probably always posed a barrier to boats but the river follows a pass through the low mountains towards Sofia, where other rivers and their valleys offer routes to the Hungarian Plain and the River Danube. This is a well-used east-west route from Asia to Europe, via the Bosporus and avoiding the Iron Gates Gorge on the Danube (see Fig. 4.1). Downstream, the river flows east then south (as the Hebros) and enters the Aegean Sea at Aenos (Enez), an important Iron Age port for Greek trade.

The site was occupied from the fifth to second centuries B.C. and flourished in the fourth and third centuries, when it enjoyed the benefits of considerable trade with Macedonia and the Aegean islands (Archibald 2002). It had a monumental town wall, paved streets and some substantial buildings. There is considerable evidence for iron working inside the town, many hearths or altars (the features are called 'altar-hearths' in Bulgarian) and areas with many pits. Some of these are clay-lined, presumably to facilitate repeated access.

The artifacts derive from many sources, although the architecture and many ceramics clearly indicate Greek influence alongside local products and imports from the Black Sea (see Fig. 4.1). The area was affected by the wars between the Persian and Greek empires, the expansion of Macedonia, and the movements of the Scythians (Archibald 1998). Two phases of destruction, *circa* 300 B.C. and 278 B.C., have been linked by the excavators to movements of people from Central Europe. This is based on the findings of artifacts and weaponry of La Tène type in the top of destruction layers, and the coincidence of the later date with that noted by Pausanius for the invasion of Greece by Celts (Bouzek 2005). While these findings might indicate the actual presence of people from Central Europe rather than imports of luxury items, there is no consensus as to whether they represent transient raids or the beginnings of more long term influence or occupation (Barford 1991). By analogy with other towns with evidence for commerce, industry and long distance contacts, we can speculate about who might have been active in the town. Besides local inhabitants and the people living and farming in the surrounding countryside, the town would have attracted merchants (both local and foreign), tradespeople, craftsmen (again, variously indigenous, immigrant or transient), boat crews, scribes and administrators, people who looked after warehousing, and secular as well as religious leaders amongst others. Some individuals or groups may have had military affinities or have been freelance mercenaries. Besides indigenous Thracians, we can hypothesise that people with Greek or Aegean origins might have been present, and possibly some from Central or Western Europe and elsewhere although the potential numbers of non-indigenous occupants are unknown.

The prolific finds of animals bones and ceramic sherds throughout all of the excavated areas indicates that consumption levels of both were quite high. We do not have human skeletal remains from the site so cannot test directly for the proportions of protein contributed to their diet by meat, but the circumstantial evidence suggests that meat was not a scarce commodity.

There is very little comparable faunal material from excavations of contemporaneous settlements in Bulgaria. Most sites investigated have been Thracian tombs, renowned for their opulent artifacts. The report (Beech 2007) on the substantial faunal assemblage from the considerably later Roman and Byzantine site at Nicopolis ad Istrum in northern Bulgaria does not mention any special deposits similar to those described here.

	Sample 1	**(Sample 2)**	**Sample 2**	**Sample 3**	**comparison**
Grid Square:	**B23**	**A9**	**A9**	**D 19**	**B21**
Context:	**VI planum**	**[952]**	**[952] K/1960**	**Pit 19/02 [1021]**	**48, 58, 122, 146, 151**
Context Type:	**Horizontal Layer**	**Pit**	**Basal layer in pit [952]**	**Pit layer**	**Horizontal Layers**
Cattle *Bos*	95 *50%*	35 *12%*	8 *4%*	70 *43%*	135 *44%*
Sheep/goat *Ovis/Capra*	57 *30%*	181 *61%*	127 *69%*	69 *43%*	123 *40%*
Pig *Sus*	22 *12%*	52 *17%*	28 *15%*	5 *3%*	33 *11%*
Dog *Canis*	12 *7%*	-	-	7 *4%*	9 *3%*
Horse *Equus*	2 *1%*	3? *1%*	3? *2%*	-	1 ~
Red Deer *Cervus*	-	2? *1%*	2? *1%*	-	2 + ?1 *1%*
Hare *Lepus*	-	4 *1%*	1 *1%*	1 *1%*	2 *1%*
Bird Aves	3 *2%*	21 *7%*	15 *8%*	11 *7%*	3 *1%*
Total identified	**191**	**298**	**184**	**163**	**309**
Others	49	448	209	214	685
Total recovered	**240**	**746**	**393**	**377**	**994**

Table 4.1. Fragments recovered by hand from three selected contexts at the Iron Age town of Pistiros, near Vetren, Bulgaria. Sample 1 is B23 planum VI, a dump of material against the inner face of the town wall. Sample 2 is the basal, ashy, deposit K/1960 in a clay-lined pit (A9 [952]) behind a substantial town house fronting the town's main street. Sample 3 is a layer [1021] in another clay-lined pit (D19/02) elsewhere in the town. Contexts 48, 58, 122, 146 and 151 in grid square B21 are general layers and are provided as examples of 'normal' refuse deposits.

The faunal material

This paper examines three selected groups of animal bones deposited in different parts of the town. They illustrate some of the main types of deposition seen at the site, and demonstrate that similar types of features may contain a range of deposits. The various teams excavating at the site all employ the same workforce and equipment, and the animal bones considered here were all recovered by hand during excavation. Sieved samples prove that the relative proportions of bones are biased against those from smaller species, immature individuals and small skeletal elements.

The analytical methodology utilises the Whodunnit model described by Stallibrass (2007a). This model considers questions often asked in detective stories: *What* Happened?, *Where?*, *When?,* and *How?* These four questions address the forensic-style reconstruction of past events. In addition, a detective has to consider *Who?* did it and *Why?* This paper fails to answer all six questions satisfactorily, but does raise many of the issues that concern archaeologists. In particular, it seeks to identify the variability in past activities and events which, in turn, may help to remind us of the complexities of human behaviour and the range of motives and beliefs that people may hold.

The first sample comes from a deposit immediately adjacent to the inside face of the town wall. The second sample formed the basal layer in a lined pit at the back of a well-constructed building that fronted onto the town's main street. The third sample comes from another lined pit, from an area further away from the town center. This third area contained many pits, lined and unlined, but any associated structures have been destroyed by recent agricultural practices.

Results

Sample 1

A deposit adjacent to the inner face of the town wall was examined in detail because it contained an interesting metal artifact, possibly associated with a horse harness. The excavators wanted to know if the deposit (grid square B 23 planum VI) contained the remains of a horse as well.

In fact, only two of the 191 fragments identified to species level are from equids (see Table 4.1), and these are a very well worn incisor tooth and a phalanx. Both of these could be incidental finds, particularly when the other bones are considered. Most of the remains derive from the common domestic species of cattle, sheep and goats, and pigs. These show many signs of butchery and almost certainly derive from food preparation and consumption activities. Assemblages of this nature have been recovered from many different deposits throughout the excavated areas (and some are included in Table 4.1 for comparison: see contexts from grid square B21). In addition, Sample 1 contained some dog bones and a few bird bones. The two aspects of note from a faunal perspective were the slightly higher than usual (50% rather than ~40%) proportion of cattle bones and the slightly higher than usual contribution (7% rather than ~2–3%) of dog bones. Rather than a deposit associated with the burial of a horse with its harness, this collection of animal remains appears to reflect dumping practices of unwanted refuse in a peripheral part of the settlement. Another area close to the inside of the town wall contained a concentration of metal-working slag, which may be a similar instance of waste disposal.

Some of the cattle metacarpals, metatarsals and mandibles, and some of the sheep metacarpals had been scorched in either their midshaft or in the diastema regions. One of the 241 fragments (a sheep/goat pelvis) has a mottled gray color, indicating contact with ashy matrix.

Summary Interpretation

At the moment, an application of the Whodunnit model suggests that refuse was deposited at the edge of the densely occupied area of the town, away from the main thoroughfare and behind the buildings. The motive was probably the desire to get rid of noxious waste from the densely occupied areas of dwellings and other structures. While sensibilities regarding smells and flies vary considerably, ethnographic studies indicate that items that impede movement are often cleared away, and refuse is also sometimes used to reinforce boundaries (Brück 1999). The people who took material and dumped it against the town wall probably lived inside the town. The scorched metapodials and mandibles *might* indicate a cooking method. These bones have sparse coverage of soft tissue and can become scorched when a whole carcass is roasted. The lack of gray staining or ash in the matrix suggests that spent cooking fuel and the remains of food consumption were deposited separately.

Sample 2

One of the buildings on the main street (Northern Building No. 1) had stone footings and a portico along the street frontage. It was a substantial structure in size and style, and the findings of a balance and weights as well as numerous coins might indicate that it was occupied by a merchant or utilised for commerce. At the back of the building were a few pits. One of these, a lined pit (grid square A 9 context [952]) was chosen for preliminary faunal analysis as it had produced some unusual metal and ceramic artifacts. The stratigraphic matrix of the pit indicates that deposition occurred in a series of events. The method of excavation precludes any direct observation of how bones were distributed spatially within the pit, apart from by depth.

The animal bones comprise a mixture of 'ordinary' refuse (butchered bones of domestic sheep, goats, cattle and pig similar to those in Sample 1) with items that may have been placed in the pit after specific activities. The basal layer contained much ash and the animal remains were dominated by the butchered, defleshed and heated bones of several sheep. Apart from the mandibles and maxillae that could be refitted from two complete (but butchered) sheep heads there were no articulating joints although several of the long bones and pelves appear to form pairs. All parts of the sheep/goat skeletons are represented in approximately equal numbers, except for the toes, carpals and tarsals, which are much scarcer. Due to the lack of sieving, the paucity of these small bones has to be treated as absence of evidence. The bones were definitely not deposited as articulated skeletons nor as complete carcasses, since many of the bones have been butchered or broken and very few are complete.

Most elements give estimated Minimum Numbers of Individuals (MNIs) of four or five, although the tibia and mandible both give slightly higher MNIs of seven each. At least one of these individuals was a goat, and at least five were sheep. The five skulls have horn cores that range from non-existent (naturally polled) through vestigial bumps to full horn cores. Clearly they were not selected to all look exactly the same. The pelves derive from four sheep, one of which was female. One of the three males was so young that its acetabulum was still in the process of fusing when it died. Most of the long bones have unfused later-fusing epiphyses. The mandibles indicate that three animals were mature (all permanent teeth erupted and in moderate wear) but another three were juveniles whose third lower molars were still in the crypt or only half erupted. It is probable that these three individuals were from a single cohort, and were slaughtered in their second summer or autumn. Several of the sheep mandibles and metapodials and some of the pelves have been locally scorched or heated at some point on their shafts. Sometimes the bones have broken through the scorched location (usually the diastema of the mandible), but some of the metapodials have only received slight heat alteration and are still complete. The evidence for heating takes two forms: a slight discoloration and a textural alteration. The affected bone surfaces tend to have multiple very fine linear cracks parallel to the long axis of the bone, sometimes associated with surface flaking. In addition, nearly all of the fragments in this pit (identified and unidentified) have a gray mottled surface color, presumably stained by the ashy matrix.

The relative frequencies of identified species (by fragments) in this pit are slightly unusual, mainly due to the contents in the basal layer (see Table 4.1). There are no dog bones at all, there are very few cattle bones (4%) and a high number of sheep/goat bones (69%).

Evidence from surface color

I am attempting to investigate whether or not elements went into the deposits still articulated by examining the colors of the external surfaces of each bone fragment. Many of the deposits at the site, particularly (but not exclusively) in some of the pits, contain ashy material and many of the bones' surfaces have a mottled gray coloration. It is very noticeable that some articular surfaces, in contrast, have a yellow color, even though the shafts of the bones are grayish. My interpretation of this phenomenon is that the yellow parts were protected from direct contact with the ashy deposits when they first went into the sediment. Although there are differences in surface texture that might relate to the observed variations in color (the articular surfaces are denser and smoother than the outer surfaces of the shafts and may be more resistant to uptake of staining), this remains to be tested. That idea is, however, refuted by the evidence provided by unfused epiphyses. When re-fitted, the outer surfaces of the metaphyses and epiphyses are uniformly gray, but the porous fusion surfaces themselves are yellow. Whether the yellow-colored articulations were covered simply by cartilage or whether they were physically still joined to their adjacent skeletal element cannot be ascertained, but the evidence does suggest that some bones went into the ashy matrixes still relatively fresh (*i.e.* the cartilage or articulations had not been destroyed) although their shafts had been defleshed.

Summary Interpretation

The material from the base of pit [952] at the back of the imposing building in the town center seems to contain two types of faunal material: apparently normal domestic waste and remains of butchered carcasses. The similar surface staining from the ashy matrix suggests (but does not prove) that they may have been deposited simultaneously. An understanding of exactly how the material entered the pit (placed, contained, thrown in?) requires a change to more detailed excavation methods using hand tools and three-dimensional recording with careful attention to recovery methods, *i.e.* sieving of all material.

While these aspects address the forensic questions of the Whodunnit model (*What? Where? When?* and *How?*), we still do not know the answers to the anthropological questions of *Who?* and *Why?* Much further work is required examining the associated finds in the pit itself, including the ceramics, the metalwork and the 'ordinary' bone refuse found at the same level as the sheep carcass remains. This basal deposit may contain the remains from a particular consumption event, when several sheep (and one goat) were slaughtered, cooked and butchered. Presumably several people would have taken part in this activity, as a handful of sheep provides a considerable quantity of fresh meat. These people might have come into the town especially to take part in the activity or, conversely, may have been residents. The scorching of the metapodials and mandibles seems to follow a common pattern for the town and suggests that the participants were familiar with local practices. The ash in the matrix may be waste fuel from the cooking fire(s). If that was the case, it appears that people were concerned with clearing up the leftover bones and ash and deliberately placed them together in the base of the lined pit, together with remains from previous activities.

Sample 3

The third sample is layer [1021] from another lined pit (grid square D19 pit 19/02) further away from the main street in an area of several lined and unlined pits. Like the pit in Sample 2, this contained a mixture of material that looks like ordinary domestic refuse and selected body parts that rearticulate, including a sheep's head (butchered in a similar manner to those in Sample 2) and three cattle lower limbs (possibly from a single animal: see Fig. 4.2). The two hind feet are very similar in size and conformation, and the front foot is compatible. All of the bones are fully fused. One hind foot is complete from the distal tibia downwards, the other from the naviculo-cuboid and the right front foot from the metacarpal down. In each instance there is a single phalange missing (possibly missed during recovery). Each metapodial has been scorched quite severely on its midshaft and broken through the scorched location (see Fig. 4.3). Fine knife cutmarks on the metapodials indicate that the hide(s) had been removed from the carcass(es). Whether the lower legs are waste from butchery or hide working, refuse from a major meal, or a sacrificial deposit, it is curious that there are not four 'matching' legs. Although there are other cattle bone fragments in this layer, none of them derive from a lower leg and it is not possible to suggest whether or not any of them might have derived from the same individual. The butchered cattle skull and mandible fragments cannot be assumed to derive from the same individual(s). The skull had thin horns and might derive from a castrated male while the mandibles are from a mature adult with well worn teeth. They possibly form a pair, and both have been scorched beneath the diastema/anterior cheek teeth. The species ratios are typical for the site except that there are rather few pig bones (3% see Table 4.1).

Summary Interpretation

This pit appears to have similar contents to the pit in Sample 2 in that it combines 'ordinary' (*i.e.* common types of domestic waste) with 'extraordinary' parts of an identifiable animal. But these parts are not the meaty parts. The contrast between 'several butchered (and possibly cooked and eaten) whole medium-sized animals' (Sample 2) and 'the skinned non-meaty parts of one single large animal' (Sample 3) seems distinctive enough to indicate different circumstances or intentions, although sheep heads were found in both. In addition, the absence of ash or gray staining on the cattle bones reinforces the impression that they were not treated in the same way as the sheep carcasses. Although it is certainly possible that a similar act of cooking and consumption did take place with the rest of the cattle carcass(es), the remains of this activity must have been deposited (or placed) elsewhere. The scorching of the mandibles and metapodials is a pattern observed in all three samples and the same people (or sub-sets of one cultural group) may have been involved with the activities leading to both pit deposits (not necessarily at the same time). The *Who?* may have been the same, but the *Why?* appears to have differed.

Discussion

This paper is very preliminary. Most of the animal bones are

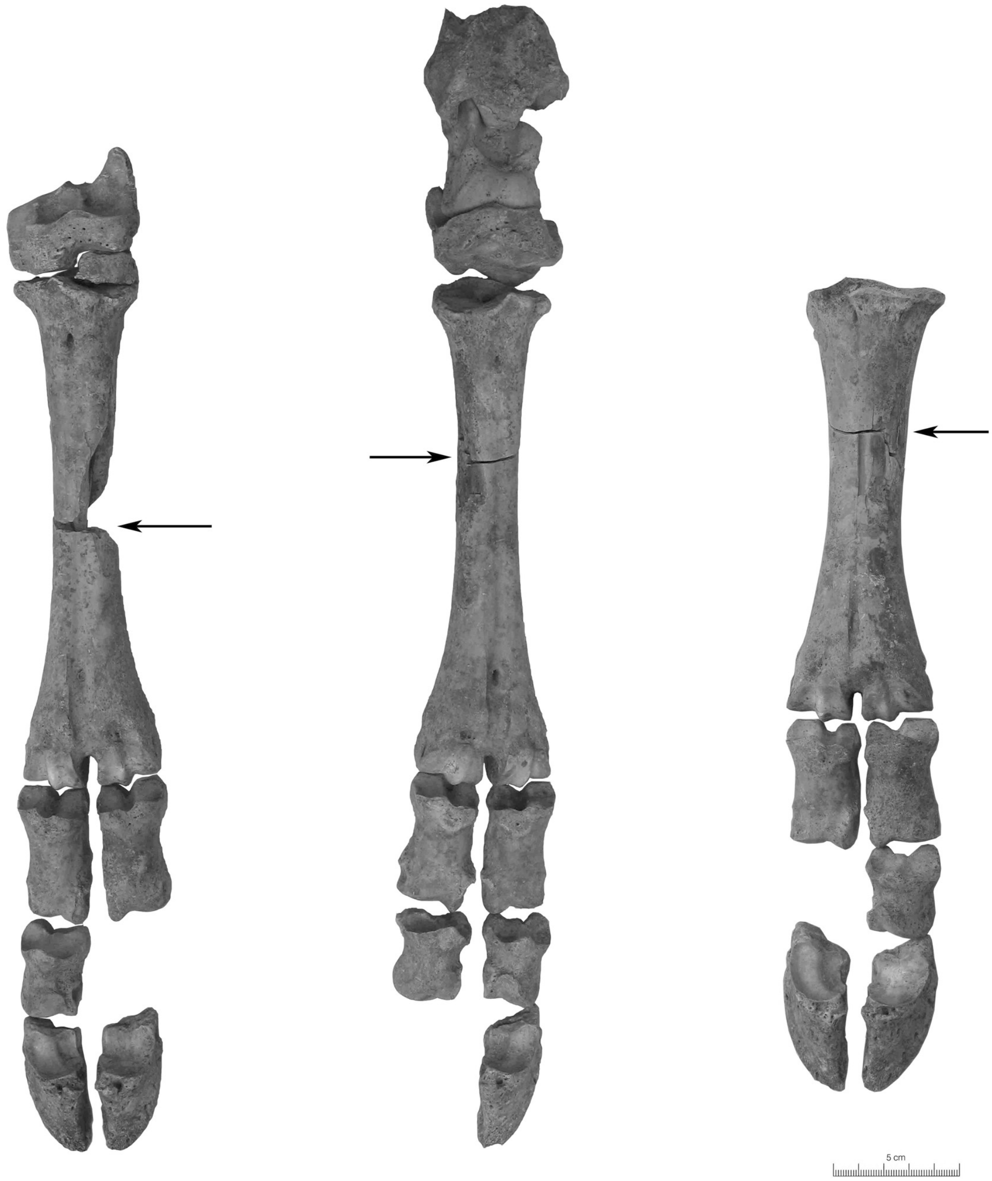

Figure 4.2. Re-articulated cattle lower leg bones (possibly from one single individual) from context [1021] in an Iron Age pit (Grid square D19 pit 19/02) at Pistiros, Bulgaria. Note how all three metapodials have been scorched midshaft. The arrows indicate breaks through the scorched areas. The lack of one phalange from each foot is possibly due to recovery methods.

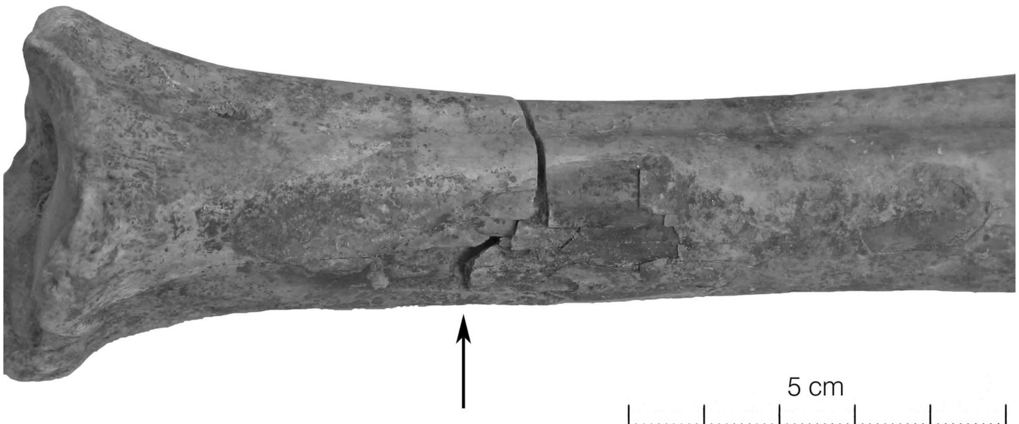

Figure 4.3. Scorched cattle metatarsal from Iron Age pit at Pistiros, Bulgaria. Note discoloration and flaky, brittle texture of affected area of bone. Arrow indicates break through bone in scorched area.

unstudied and the records need to be united in a common database with the other finds and stratigraphic data. But analysis and interpretation are iterative processes and this is a useful stage to pause and review the aims, objectives, and methodologies of the project. The basic premise of this paper is that the animal bones from this Iron Age town in Bulgaria should reflect a complexity of activities and that this will only be apparent if data are analysed at the context level rather than by period group.

The species recovered are unremarkable, although without assemblages from comparable settlement sites the species ratios cannot be evaluated at the site level (are equal proportions of cattle and sheep/goat bones to be expected?). At the context level, it is clear that the lined pits are receiving atypical proportions of species (*i. e.* some of the bones that go into the lined pits are not random samples of bones deposited at the site but are selected). This selection is apparent in individual layers as well as in individual pits. Further work is required to compare the animal bones with ceramics and metalwork to look for any patterning, *e.g.* are sheep/goats associated with pots, and cattle bones with metalwork?

The pits also received atypical groups of bones. Some of the bones in the pits (but, importantly, not all) appear to have been placed there shortly after a particular activity, whereas the usual process of deposition entails the discard, disposal or placement of apparently random bits and pieces that have become dissociated from their anatomical neighbors. Presumably this dissociation occurs due to time lapses between activity and final deposition, during which other processes intervene. The consideration of surface color, texture and butchery marks has been useful in demonstrating that deposition was not always immediate, even when parts of the same carcasses wereplaced in a pit. This implies that a conscious effort was made to gather up related parts so that they could be 'recombined' in the deposit, and this impression is reinforced by the presence of spent fuel that could have been associated with cooking fires in Sample 2.

Even though the material in the basal deposit of the Sample 2 pit appears to be the remains of a large meat consumption event, the remains of which needed to be kept together for some reason, the articulating cattle bones in Sample 3 have no direct indication of meat consumption. Rather, they are reminiscent of primary butchery waste since they comprise elements with little or no meat cover. But if these lower legs were removed prior to food preparation and consumption, why are the metapodials heavily scorched on their midshafts? Were the bones from the rest of the carcass placed somewhere else? Clearly, while it is very useful to analyze sample contexts to obtain an initial impression of an assemblage and to prompt hypotheses, these can only be tested by further work to see if features complement each other, form repeated patterns, or contain random contents.

The lined pits appear to be a particular type of receptacle for animal remains. In an initial scan of approximately 25–30% of all of the animal bones that had been excavated from the site by 2000 (Archibald 2002), it was noted that the unlined pits and general layers did not contain any refitting skeletal elements or partial skeletons. The Associated Bone Groups (ABGs) were confined to the lined pits. It is clear is that other finds in these pits are also unusual. Some have more metal artifacts in them than is usual in horizontal deposits, including broken metalwork that may have been deliberately placed there, as found at several Bronze Age and Iron Age sites throughout Europe (Benecke 2006). Others contain (nearly) complete ceramic vessels of unusual types. A thorough consideration of all of the finds (regardless of whether organic or inorganic, artifactual or ecofactual) is required in order to investigate potential associations. The slight bias towards the recovery of bones of birds (mainly domestic fowl, *Gallus domesticus*) and hare (*Lepus* sp.) in the lined pits needs to be checked by systematic sieving of all deposits.

One aspect of the treatment of the animal bones that is constant in all three samples and may be typical of the site is the heating (sometimes to a high temperature that leaves scorch marks) of the midshaft regions of metapodials and mandibles of cattle and sheep/goat. Is this typical for Thrace, and how does it compare with practices common in the area to the south of Pistiros, *i.e.* in the Hellenistic region of the Aegean? Here, there was a well-documented practice of body part deposition in religious ceremonies, but the parts and the practice were distinctly different (Sherratt, 1990). In Olympian rites, the part of a sacrificed animal that was given to the gods was a thigh bone (usually the right femur) wrapped in fat, and the whole bundle was burned. Archaeological examples or variations of this practice have been found in some Greek and Mycenaean sites and Greek colonies from the Bronze to Iron Ages (Benecke 2006; Forstenpointner 2003; Halstead and Jones 1992). At Pistiros, the hearth-altars were kept clean and they were reused, with several layers of burned clay surfaces having accumulated on top of each other. They appear to be an indigenous development in Thrace. We do not know how they were used. Nor can we directly associate any animal bones with their uses, but it is possible that the pits, (possibly only the lined pits), were designated receptacles for material cleared away after an event, prior to the next surface being applied.

The deposition of rearticulating lower limbs of cattle (with or without head bones) is also unusual for Greece, but is common in Western and Central Europe. Indeed, when the author first saw them in the initial scan in 2000 she was struck by their similarity to material found in Britain (Stallibrass 1988). Does this indicate any cultural or ethnic links, or is it simply a coincidence? Džino (2008, 59) argues that complex movements of people, customs and artifacts in Southeastern Europe led to hybrid identities. He suggests that, rather than indicating 'ethnic elements', new practices or artifacts could indicate local people expressing their identities in different ways. Further discussions of how to tell *Who?* undertook various activities involving the deposition of animal bones at Pistiros are required but are beyond the scope of this paper.

Why? people undertook these practices also requires detailed consideration. Here are some preliminary thoughts. Motives can be simple and utilitarian. For instance, people are often motivated to take large amounts of decomposing rubbish away from their homes, in order to keep it out of the way and to distance unpleasant smells and animal pests from their dwellings. But it is simultaneously a good way of defining boundaries and liminal areas, or 'marking territories', such that a single practice (rubbish dumping) can have functional utilitarian motives combined with social and conceptual implications. Other motives can be much more complex or subtle, and include conscious motives and habitual 'sub-conscious' motives that are difficult to confirm with empirical data. Conscious motives might be an intention to keep supernatural beings well-disposed towards the actors by presenting them with gifts. It is possible that the manner in which gifts are deposited can become a ritual or habit in which the original intention of the action becomes less obvious than the direct effects of the habit. Routine habits can reinforce social, cultural or ethnic cohesion (Bourdieu 1977).

The deposition of articulating or associated body parts (ABGs) of sheep and cattle in lined pits at Pistiros may simply be the disposal of noxious butchery or consumption waste, but it probably had much greater significance. The deposition of ABGs is a common occurrence at Iron Age sites in Western and Central Europe and does appear to be structured in terms of what is deposited, how it is treated, and the type of context in which it is deposited. The deposition of ceramics and metalwork in the lined pits is extremely similar to that of animal remains. All three types of material include complete or near complete items (ceramic vessels, metal artifacts, animal carcasses). In the case of the ceramics and the animals, the similarities are even more marked: the assemblages combine 'special' items (ABGs and whole vessels) with 'ordinary' material (sherds and broken bones). In both cases, the 'ordinary' material does not appear to be either incidental or residual material incorporated into the backfill of the pits. Clearly, we must distinguish between casual discard, deliberate disposal, and careful placing. Sometimes the manner of placement is important (keeping associated items together: ABGs), sometimes it is the locus of placement (the limits of the town, a lined pit) that has significance. In Sample 1, it seems that the material placed and the manner of its deposition were not special, but the location was. For the two lined pits in Samples 2 and 3, the material *and* how it was deposited *and* where it was placed were all important.

These deposits can be regarded as parts of *châine operatoires*, which involved considerable planning. They required access to resources (possibly involving local production), through various activities involving the slaughter, butchery, skinning, preparation, cooking and consumption of large quantities of meat, the collection of material produced by these activities (animal bones, ceramics, sometimes the spent fuel ash: often combining 'immediate' refuse with material created by previous activities), and the deliberate placement of these materials in specific locations (lined pits, especially basal deposits). Although the placement of the material in the pits may have provided a sense of closure, the knowledge that they remained placed there would have been long-term. Unlike the unlined pits, these lined pits provided possibilities for later access, either to revisit the basal deposit, or to add subsequent deposits. Future work aims to 'unpick' a complete sequence of a lined pit.

Conclusion

This paper describes a preliminary aspect of the analysis of over one metric ton of animal bone from a complex Iron Age site that demonstrates multiple lines of contact across a wide geographical area. Trying to investigate specific questions such as '*Who?* deposited these groups of animal bones?' and '*Why?* did people do this?' has demonstrated that the excavation and analytical methods are flawed or incomplete. There is still time to improve the excavation techniques, in particular to ensure that small bones are recovered and that any spatial layout of bones (*e.g.*, body parts) can be observed *in situ*. The post-excavation techniques employed have identified some useful practices, particularly that of looking at individual contexts and deposits. This slows down the analyses by requiring them to be undertaken and reviewed in stages, but it gives far more detail and understanding than any phase groups would have produced. In addition, the use of surface color has been demonstrated to aid identification of defleshed but still fresh bone deposits. The other factor highlighted as being extremely important is the integration of all archaeological evidence. The potentially significant associations of particular species, metal artifacts, animal body parts and ceramics demands an integrated database plus iterative discussions amongst the specialists and excavators. These preliminary results indicate that animal bones do have the potential to be used in investigations of who was active at a site. The articulating cattle legs may suggest links between some of the people at Pistiros on the Plain of Thrace at the far eastern edge of Europe with people who lived much further west. Considerable amounts of further work are required to see if these people were a minority population, new arrivals, or the long term 'locals'. The town may have been a thriving cosmopolitan port, and the animal bones have a part to play in investigations of just how cosmopolitan it may have been.

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5. Status and Diet at the Workers' Town, Giza, Egypt

Richard Redding

Faunal remains provide the most accessible large database to examine socioeconomic infrastructure. Hence, faunal analysis is a major tool in explaining the origin and evolution of cultural complexity. The faunal remains from the Workers' Town at Giza Egypt, provide evidence of the value of fauna as a tool in research on the evolution of cultural complexity. Excavations at an area near Giza, have revealed a complex of barracks (where the workers who built the pyramid of Menkaure lived), high status workers' residences, storage facilities, elite residences and a supporting town. The distribution of remains of various vertebrate taxa exhibits patterns across this complex. Higher status workers had preferential access to cattle and the Nile perch. Workers in the barracks were provided with less desirable meat from sheep, goats and catfish. Residents of the support town utilized the pig. Statistical analysis indicates that these differences are significant.

Keywords: Egypt, pyramids, urban, provisioning, cattle

Introduction

Changes in the socioeconomic structure of a society are a primary marker of the evolution of cultural complexity. Hence, the identification and explanation of changes in socioeconomic structure are at the core of archaeologists' goal of explaining the origin and evolution of cultural complexity. I would argue that the socioeconomic infrastructure of complex societies is eminently accessible through the analysis of faunal and floral remains. The construction of models of socioeconomic behavior and their testing, using faunal and floral data, allow archaeologists to develop explanations of changes in and the development of cultural complexity.

I have undertaken a long-term study in Egypt of Old Kingdom socioeconomic infrastructure using faunal and floral data. Excavations in the 1980s at the Old Kingdom village site of Kom el-Hisn (Wenke and Redding 1985, 1987; Wenke *et al.* 1988; Redding 1992; Redding, *in press*), located in the Nile Delta, provide insight into the economic infrastructure that supported pyramid construction, which was the major signature of Old Kingdom economic activity. The Kom el-Hisn faunal material has been compared to other Pre-dynastic, Old and Middle Kingdom faunas (Redding 1992) in an attempt to identify patterns in Old Kingdom faunal use. In 1988 the Giza Plateau Mapping Project began excavations at the Giza Plateau in an area just south of the pyramid complex. This area has proven to be a town that housed a portion of the workers, specialists, administrators and ancillary people associated with the construction of the Third Pyramid, the Pyramid of Menkaure. The faunal and floral remains from these excavations have provided new insight into the socioeconomic infrastructure that supported pyramid construction during the Old Kingdom (Redding 2007a, Murray 2007). In this paper I will focus on patterns in the distribution of faunal remains within the Workers' Town at Giza as an example of the use of faunal data to attack problems pertaining to socioeconomic structure. I will begin with an overview of the site and our work. This will be followed by a brief review of the general results of my faunal investigations at the Workers' Town at Giza. I will then focus on the recently discovered patterns in the faunal data of the Workers' Town that provide indications of social stratification.

The Workers' Town at Giza

Excavations at the Workers' Town begin in 1988 under the leadership of Mark Lehner (see Lehner 2007 for a history of the project). The site lies south of the pyramid complex at Giza, just beyond a large wall (about 10×10×200m), the Wall of the Crows, that separates the pyramid complex from the high remnants of a Pliocene beach ridge and a low, sandy plain that slopes down to the Nile valley and the edge of the modern town of Kafr Gebel. The sandy plain was used as garbage dump for the town of Kafr Gebel. Our first excavations in 1988–89 revealed mud-brick and stone architecture. Typically, the undisturbed archaeological strata lie under one to four meters of sandy garbage, a thin, variable layer of clean, wind blown sand and a strata of brown mud mixed with sherds and bone. The levels with architecture and *in situ* remains vary from several centimeters to over two meters in thickness.

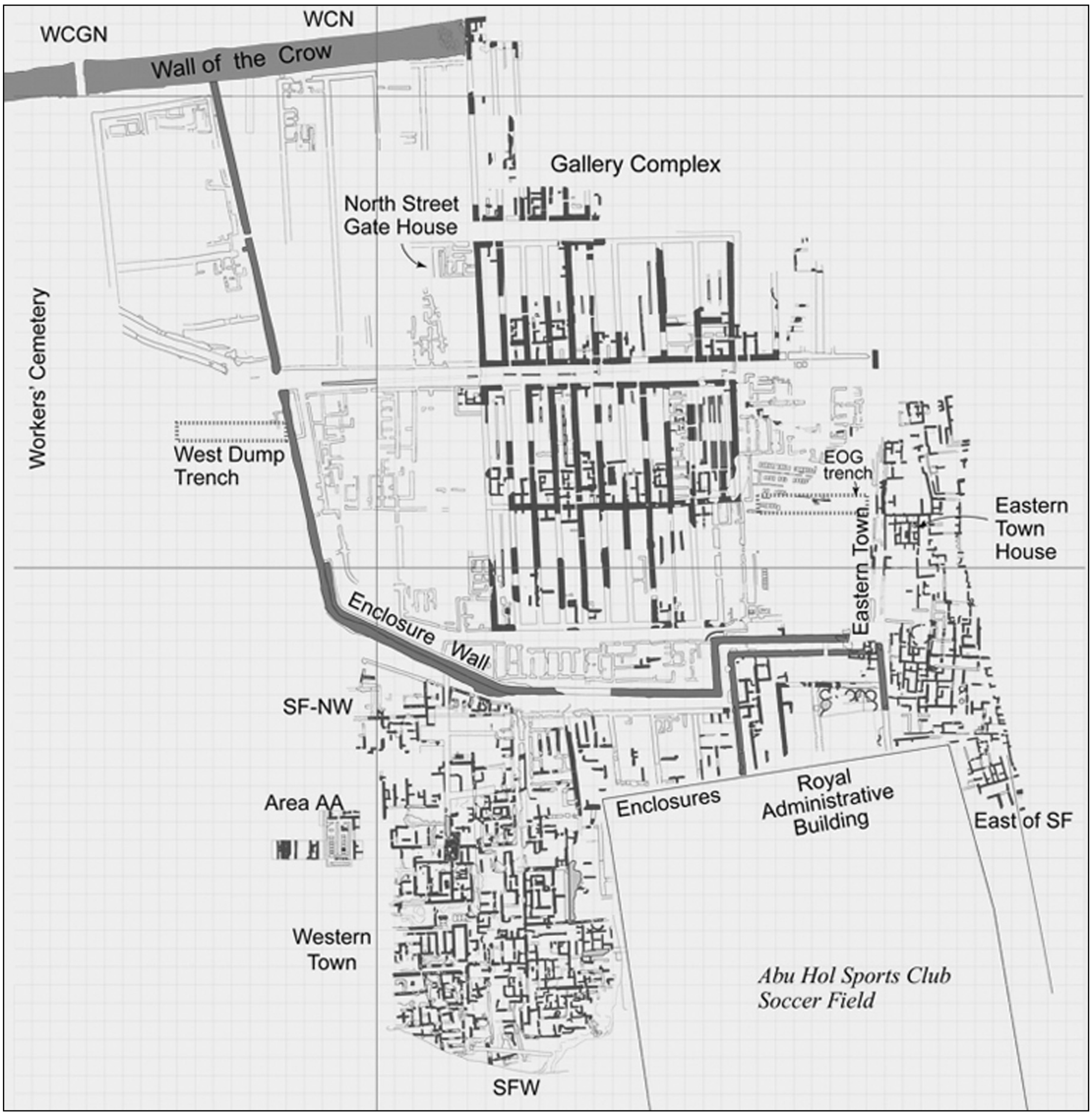


Figure 5.1. Plan of the excavations at the Workers' Town.

After the excavations in 1988–89 we realized that by removing the overlying trash and clean sand we could expose the architectural footprint of the site (Fig. 5.1). As we exposed each new area of the site we carefully mapped all visible walls and structures. Selected areas, rooms and whole structures were selected for complete excavation. We have identified several functional areas at the site and, within these found areas of special function (see below). The largest functional area is the Gallery Complex, which is separated from the rest of the site by an Enclosure Wall that isolates it from the elite residences, Royal Administration Building and the Eastern Town (Fig. 5.1). The Gallery Complex is divided by three streets; designated North, Main and South. The Gallery Complex includes several identified special areas including bakeries, work areas, points of control (*i.e.* gate houses), and individual barracks and the enigmatic Hypostyle Hall. The Gate Houses are located at the west ends of the three streets. South of the Gallery Complex is an administrative and storage area that we refer to as the Royal Administrative Building (RAB). A wall separates the RAB from the rest of the site (on at least three sides). The north wall of the RAB passes close by the Enclosure Wall creating a double separation from the Gallery Complex. The special areas in the RAB include five granaries, three or four storage areas (enclosures), and a restricted passage. East of the Gallery Complex and the RAB is an Eastern Town (ET). This is composed of numerous small residential structures and is less planned, more organic than the Gallery Complex or the RAB. West of the RAB, south of the Enclosure Wall and west the existing Soccer Field is the Western Town (WT). This is composed of larger residential structures. The WT also includes a feature we refer to as the "pottery mound". The pottery mound is a dump that contains dense deposits of pottery, bone and administrative artifacts (sealings and seal impressions). We believe the dump to be the garbage from an elite, probably composed of high level scribes, that lived/worked in the WT and RAB.

The deposits at the Workers' Town date to the Fourth Dynasty of the Old Kingdom and most of what we have excavated is associated with the approximately 24 year reign of Menkaure, fifth Pharaoh of the Fourth Dynasty. A second, earlier town, which is largely unexcavated, lies underneath and is associated with Khephren, the fourth Pharaoh of the Fourth Dynasty.

A Review of the Fauna from Workers' Town at Giza

I have examined over 310,000 bone fragments from the Workers' Town at Giza. The measure of abundance that I use throughout this report is NISP (Number of Identified Specimens). This is simply a raw count of the number of fragments that can be ascribed to each taxon or category. At present this is an estimate, as I have not totalled all the records. I will assume that the faunal remains from the site reflect consumption of animals by the humans that occupied each area of the site (*e.g.*, material from the barracks reflects the diet of the inhabitants of the barracks). This actually involves two separate assumptions. The first is that all the remains are from consumption. The possible presence of intrusive, non-consumption, fish remains has been tested for by examining nearby deposits of Nile silt and the mud bricks used in the construction; both of which are free of any fish bones. Since no temples or offering areas are apparent in the Workers' Town it is unlikely that the mammal fragments are biased by contamination with non-consumption remains. The second is that transport of remains has been minimal. Undoubtedly, faunal remains do disperse from their area of consumption to some extent. So, any pattern we see will be subject to a smear effect, like looking through an oil smeared lens. So, any patterns that are identified must be robust. All of the faunal remains recovered come from deposits in and around structures that appear to be residential.

We recovered the bone from each feature by hand. Added to the hand picked sample were bone fragments found in a 0.2 cm screen. Some features were subject to wet screening and a sample of each feature was floated and some bone was found in the heavy fraction.

This is not a final report on the fauna from the Workers' Town. I will not give detailed counts for all taxa. I will use partial data sets to examine diet and status at the site. All the comments made in the general discussion of the faunal remains from the Workers' Town are based on the sample for the entire site: the whole site sample. In a subsequent section I will examine the variation in some of these variables in defined areas of the site.

Mammals dominate the faunal remains but fish are abundant. The ratio of mammal to fish fragments is 13.2: 1. Birds are poorly represented and reptiles remains are rare. The ratio of mammal fragments to fragments of bird is 278:1 and the ratio of mammal fragments to reptile is 20,000:1.

Class Osteichthyes

Fish taxa in the sample from the Workers' Town include: the schal group (*Synodontis* spp.), the Nile catfish (*Clarias gariepinus*), one or more cichlids (*Oreochromis niloticus*, *Sarotherodon galilaeus*, and/or *Tilapia zillii*), the Nile perch (*Lates niloticus*), the bajad (*Bagrus bayad*), the tiger fish (*Hydrocynus forskahlii*), the binni (*Tor bynni*), the flat-headed mullet (*Mugil cephalus*), a carp (*Labeo* sp.), the globe fish (*Tetraodon lineatus*), and the freshwater eel (*Anguilla anguilla*). The taxa are provided in rank order in this list. The Schal and Nile catfish are about three times as abundant as the next group of taxa: the cichlids, Nile perch and Bajad. The remaining taxa are not common in the sample of fish remains. The fish are a study in progress and a large number of to-be-identified fragments will undoubtedly add to the list of taxa.

The majority of the fish remains come from larger specimens that were probably speared or netted. These may have been consumed fresh, but some fish were split and perhaps dried. In the area identified as the Hypostyle Hall large number of fish fin impressions were observed in the floor of the structure. This might suggest that the enigmatic Hypostyle Hall, with its alternating rows of troughs and benches, was a meat processing and/or drying area.

Because many of the fish fin impressions found in the Hypostyle Hall were from small fish, I decided to see if some small fish bones were being lost due to the size of the screens or rough handling in wet screening. I decided to sample several features that had concentrations of fish bones using a gentle, dip flotation technique using very fine screens that was designed to recover small delicate bones. I began to recover bones from very small fish that had a maximum length of about 8 cm. The fragments are dominated by two taxa, species of the genus *Synodontis* and the cichlids. In discussions with our workmen I learned that in areas of Egypt at present small fish are dried, salted and eaten like potato chips. They stated that these dried fish are still produced in villages south of Luxor. An elaborate fishing scene in the Old Kingdom tomb of Mereruke, at Saqqara, shows several methods for capture of fish. In one scene large fish are speared, in another they are netted, and a third panel shows fish traps. In a fourth scene two fishermen have triangular nets that they are dipping into the water. These nets contain large numbers of small fish: none of which are larger than the hands of the fishermen. Many of these fish are identifiable and are primarily from two taxa; the schal and a cichlid.

Class Reptilia

The reptiles recovered from the Workers' Town deposits include the crocodile (*Crocodylus niloticus*) and the soft-shelled turtle (*Trionyx triunguis*). I have identified only seven fragments of soft-shelled turtle and five of crocodile.

Class Aves

I recently completed the identification of all the bird bone

Common Name	Scientific Name	Count
Bean Goose	*Anser fabalis*	14
White-fronted Goose/Greylag Goose	*Anser albifrons/Anser anser*	4
Egyptian Goose	*Alopochen aegyptiacus*	11
Shelduck	*Tadorna tadorna*	13
Wigeon	*Anas penelope*	49
Gadwall	*Anas strepera*	2
Teal	*Anas crecca*	107
Pintail	*Anas acuta*	138
Shoveler	*Anas clypeata*	5
Pochard	*Aythya ferina*	4
Quail	*Coturnix coturnix*	1
Water Rail	*Rallus aquaticus*	3
Coot	*Fulica atra*	34
Crane	*Grus grus*	16
Ringed Plover	*Charadrius hiaticula*	1
Snipe	*Gallinago gallinago*	1
Rock Dove	*Columba livia*	5
Sparrow	*Passer* sp.	1

Table 5.1. Bird taxa and counts (NISP).

fragments that have been recovered before May 2008. The identifications were possible because the Museum of Zoology at the University of Michigan has a collection of 970 bird skeletons from Egypt. This collection was made by Steven Goodman. I provide a list of the taxa and counts for each in Table 5.1. The majority of the identifiable bird fragments come from waterfowl. These include a series of potential domesticates: the pintail, *Anas acuta*, the widgeon, *A. penelope*, the teal, *A. crecca*, the bean goose, *Anser fabalis*, the Egyptian goose, *Anser aegyptiaca*, and the crane, *Grus grus*. It is unclear when these birds were domesticated in Egypt but it is at least likely that the pintail may have been domesticated as early as the Old Kingdom as the pintails are readily domesticated (Houlihan and Goodman 1986). All of these taxa were maintained in aviaries or poultry yards. The crane is depicted in a Fifth Dynasty tomb at Saqqara in large troops and being force fed.

The distribution of birds on the site is of interest. Only 72 of 409 identified bird fragments come from within the enclosure walls. The vast majority of the identified bird fragments, 244 of 409, are from the WT area of the site. Birds seem to concentrate in the RAB and WT.

Class Mammalia

Domestic taxa dominate the mammalian sample. The domestic taxa include: cattle (*Bos taurus*), sheep (*Ovis aries*), goats (*Capra hircus*), pigs (*Sus scrofa*) and donkey (*Equus asinus*). Additionally, we recovered a small number of fragments from a medium canid, probably the dog (*Canis familiaris*). Wild taxa are rare. The wild taxa include: Hippo (*Hippopotamus amphibius*), Bubal hartebeest (*Alcelaphus buselaphus*), Addax (*Addax nasomaculatus*), and a Gazelle (*Gazella* sp.). The identification and study of the mammalian material is incomplete and the counts provided here are only a sample of the material studied.

Bos taurus – Cattle are the second most abundant mammal in the samples with over 8000 fragments recorded. The ratio of fragments of cattle to fragments of sheep and goat is 0.35:1. If the ratio of cattle to sheep-goats being consumed on the site was close to this number, one might assume that sheep and goats were more important than cattle. However, a young male bull will provide 8–10 times the meat weight of a sheep or goat (Dahl and Hjort 1976). Hence, even given the lower number of cattle fragments, cattle provide about 3.5 times the meat of sheep and goats.

Based on fusion of the phalanges and distal metapodials, 50% died before 18 months, and only 20% were older than 24 months. A sex ratio for the cattle sample uses size and shape of the ilio-pectineal eminence on the pubis fragments. The ratio of males to females is 6:1: this is an extremely biased slaughter sex ratio. The cattle consumed on the site were predominately young and male.

Ovis-Capra – Sheep and goats are the most abundant mammalian taxon in the sample. I have recorded over 25,000 sheep/goat fragments. I have found that I can, with a high degree of confidence, separate sheep and goats fragments based on 13 elements. These are the petrous-temporal, scapula, distal humerus, proximal radius, distal radius intermediate carpal, radial carpal, calcaneum, astragalus, metapodials, first phalanx and second phalanx. Using those fragments of these elements that are sufficiently complete to show the appropriate character states, the ratio of sheep to goats in this sample is 3:1. Based on fusion data for distal humeri, phalanges and distal metapodials, 10% of the sheep-goats died before 10 months, 50% died before 16 months, and only 10% were older than 24 months. Based on the pubis, the ratio of males to females is 11:1. Again, this slaughter sex ratio is extremely biased. The sheep and goats consumed on the site were predominately young and male.

Sus scrofa – I have recorded over 1000 fragments of pig bones. The ratio of cattle to pig is 8.1:1 and the ratio of sheep-goat to pig is 23.1:1. Pig is a distant third in importance among the mammals.

General Conclusions Based on the Entire Sample for the Workers' Town at Giza

We estimate that 6–8000 people lived in the Barracks area of the site and other specialists and administrators lived around the Barracks. Given modest estimates of meat consumption the catchment area for supporting this many individuals must have extended well into the Nile Delta and South along the Nile. I am working on an estimate of the size of the catchment area required using ration estimates and determining the herd size necessary to support the required offtake. The problem I am encountering is obtaining good estimates of the carrying capacity of the Nile Delta and Nile Valley.

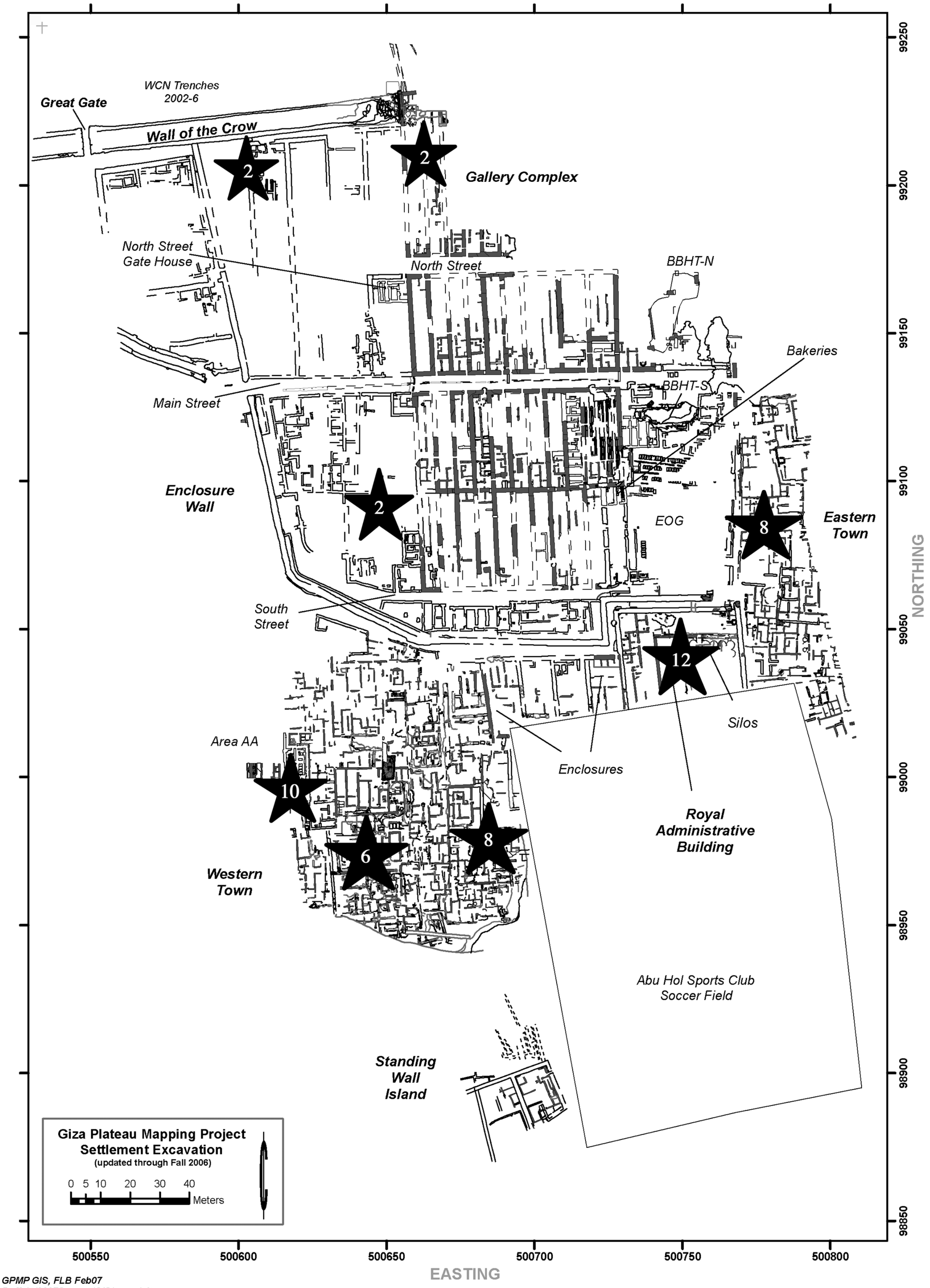
Given the size of the population housed in the Workers Town and the faunal data presented above I have extracted several conclusions. The most important of these is that the site was provisioned. By this I mean that food resources were brought onto the site from other areas of Egypt and not obtained locally. The majority of the inhabitants were not engaged in any food producing or procuring activities; they were construction workers and specialists. They were not herding, hunting, nor planting crops. This is based on a number lines of evidence. First, age and sex structure of the cattle, sheep and goats. The pattern is one of off-take from large herds. It is the mirror image of the producing village of Kom el-Hisn. Second, the near absence of wild mammalian taxa. Shepherds and young boys would encounter hares, hedgehogs, foxes, *etc*., that would have been brought back to the site for consumption (von den Driesch and Boessneck 1985, Redding in press). Third, the near absence of large, hunted taxa like the Bubal Hartebeest, oryx, addax, gazelle and hippopotamus. Again, these taxa are not uncommon in producing sites in the Nile Delta (von den Driesch and Boessneck 1985, Redding in press). They could have been hunted on the high desert just west of the pyramids. Elements of the hippo are found on the site but these are teeth and teeth related fragments that exhibit evidence of use in manufacture of objects, and they are located around one structure in the ET. Fourth, the near absence of large numbers of readily available wild bird taxa; for example, the rock dove. These birds are ubiquitous around the pyramids today. They would have roosted on the already completed pyramids of the earlier rulers of the 4th Dynasty, Khufu and Khephren. Finally, the elements of wild mammalian taxa that do occur, show an unusual distribution. Fig. 5.2 shows the location of the fragments of wild mammalian taxa on the site. Notice that all but two of these are located in the RAB and in the Eastern and Western Town. Indeed, the majority are located in the RAB and the Western Town, both occupied by elite who would have had time to hunt.

The Distribution of Fish and Mammals Across the Site

As I began to examine the distribution of the faunal remains across the site it became apparent that the distribution is not equal or even random. Patterns in the distribution obtain and these patterns need to be explored and explained. I will compare the distribution of taxa between three areas of the site. The first of these is one completely excavated barracks unit (Gallery III.4) (Fig. 5.3). The barracks were probably the living quarters for large numbers of workmen who formed the members of the various "gangs" that moved and set the blocks. These workmen would have been brought to Giza from all over Egypt, as a conscripted work force, who were fulfilling the obligations of their region of Egypt to the "Great House", to Pharaoh. The second of the areas for comparison is the North Street Gate House (NSGH) (Fig. 5.3). This structure sits at the west end of north street and was a control point that regulated traffic on north street and access to the pyramid complex from barracks along north street. The NSGH complex was about 10x10 meters and was probably occupied by individuals of some authority. The North Street Gate House was completely excavated. This area was probably utilized by elite individuals. The third area is the Eastern Town (ET) (Fig. 5.3). The structures in this area are small. We believe this area to have been occupied by individuals who formed a support system for the individuals living in the barracks. Our operating hypothesis at present is that the residents of the Eastern Town were probably not part of the provisioned area of the site. I selected these three areas because they are discrete samples within the site that we believe have clear functional differences

Table 5.2 provides the raw counts (NISP) for each taxa used in the comparisons. The samples for the Barracks, NSGH and ET are based on bone identified up to an including the 2005 season. The entire site sample is based on totals calculated at the end of 2004. Over 150,000 fragments have been examined since 2004 but a comparison of taxa for which I have new totals suggests no major changes in relative abundances. As an initial comparison, I have calculated ratios for various taxa for each area used in the comparisons (Barracks, NSGH, and ET). I also have calculated the same ratios for the sample for the entire site. Table 5.3 presents the ratios for the four areas and the entire site. Some patterns are apparent in Table 5.3, but the question is, are the differences statistically significant?

I have performed a series of tests using a robust, non-parametric statistic for measuring relatedness, the Chi-square. The hypothesis tested with Chi-square is whether or not two different samples are different enough in some characteristic or aspect that we can generalize from our samples that the populations from which our samples are drawn are also different. The tests are pairwise and the first test I have performed on each area is a test against the "expected". For the "expected" I used the whole site sample. This initial test tells us if the sample for the area is significantly different from the pattern in the whole site sample. Subsequently, each area is tested against the other



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Buffalo/2007Season/GIS/maps/site

Figure 5.2. Plan of the Workers' Town with occurrences of wild taxa indicated by stars. (Each star includes number of fragments from wild taxa for that site area).

Area	Fish	*Clarias + Synodontis*	*Lates*	*Aves*	*Bos*	*Ovis-Capra*	*Ovis*	*Capra*	*Sus*
Barracks	912	103	5	12	103	1166	127	96	28
NSGH	720	26	67	43	161	96	14	6	10
ET	119	24	0	13	28	75	5	0	66
Whole Site Sample	10,610	1521	145	503	2346	6897	554	211	386

Fish – count of bone fragments identified as fish
Clarias + *Synodontis* – count of fragments for two genera of catfish considered less desirable fish
Lates – count of fragments for the Nile Perch considered a highly desirable fish
Aves – count of bone fragments identified as bird – includes fragments not identified to taxa
Bos – count of bone fragments identified as catle
Ovis-Capra – count of bone fragments identified as sheep or goat
Ovis – count of bone fragments identified as sheep
Capra – count of bone fragments identified as goat
Sus – count of bone fragments identified as pig

Table 5.2. Comparison of various taxa, based on NISP, from three areas of the workers' town: The Barracks, NSGH and ET.

Area	Fish: Catfish	Fish: Perch	Fish: Id Mammal	Cattle: Bird	Sheep-goat: Bird	Sheep-goat: cattle	Sheep: Goat	Sheep-goat:Pig	Cattle: Pig
Barracks	8.9 (11.2%)	183.2 (0.5%)	0.7	8.6	97.2	11.3	1.3	41.6	3.7
NSGH	27.7 (3.6%)	10.7 (9.3%)	2.7	3.7	2.2	0.6	2.3	9.6	16.1
ET	4.1	-	0.7	2.2	5.8	2.7	-	1.1	0.4
Entire Sample	7.0 (14%)	73.2 (1.3%)	1.1	4.6	13.7	3.0	2.4	17.9	6

Table 5.3. Comparison of species ratios of various taxa for three areas of the workers' town and the entire site sample.

areas. Are they significantly different from each other? I have used the counts (NISP) in Table 5.2 to perform the tests.

In the test of the Barracks sample against the whole site sample the Chi-square value is 899.064. This value suggests that the differences between the Barracks and the whole site sample are highly significant ($p \leq 0.001$). The test of the Barracks against the NSGH (Chi-square = 219.778, and against the ET (Chi-square = 436.832) all yield values that suggest the differences are highly significant ($p \leq 0.001$).

The test of the NSGH versus the whole site sample yielded a Chi-square value of 640.065. This value suggests that the differences between the NSGH and the whole sample are highly significant ($p \leq 0.001$). Tests of the NSGH and the ET samples (Chi-square = 305.795) suggest the differences are highly significant ($p \leq 0.001$).

The test of the ET versus whole site sample yielded a Chi-square = 581.619 ($p \leq 0.001$). This suggests, again, that the ET sample is highly significantly different from the whole site sample.

Given that the differences between all of these samples and the whole site sample are significantly different, the question becomes how are they different? Further, how are they different from each other? To answer this question we must return to an examination of Table 5.2.

The Gallery III.4 sample is different from the whole site sample in a number of ways. The Gallery III.4 sample has a higher than expected numbers of sheep and goats. Conversely, the number of cattle is lower than expected. The sheep and goat ratio is more biased towards goats than expected. The number of catfish is higher than expected. The number of perch is lower than expected and the number of birds is lower than expected.

The NSGH has higher than expected numbers of cattle given the whole site sample. Conversely, the number of sheep and goats is lower than expected. The sheep and goat ratio is close to expected. The number of fish is higher than expected. The number of perch is higher than expected and the number of catfish is lower than expected. The number of birds is higher than expected.

The ratio of cattle to sheep and goats for ET is very close to expected, given the whole site sample. Where the ET is remarkably different from the whole site sample and, indeed, the Barracks and the NSGH is in the number

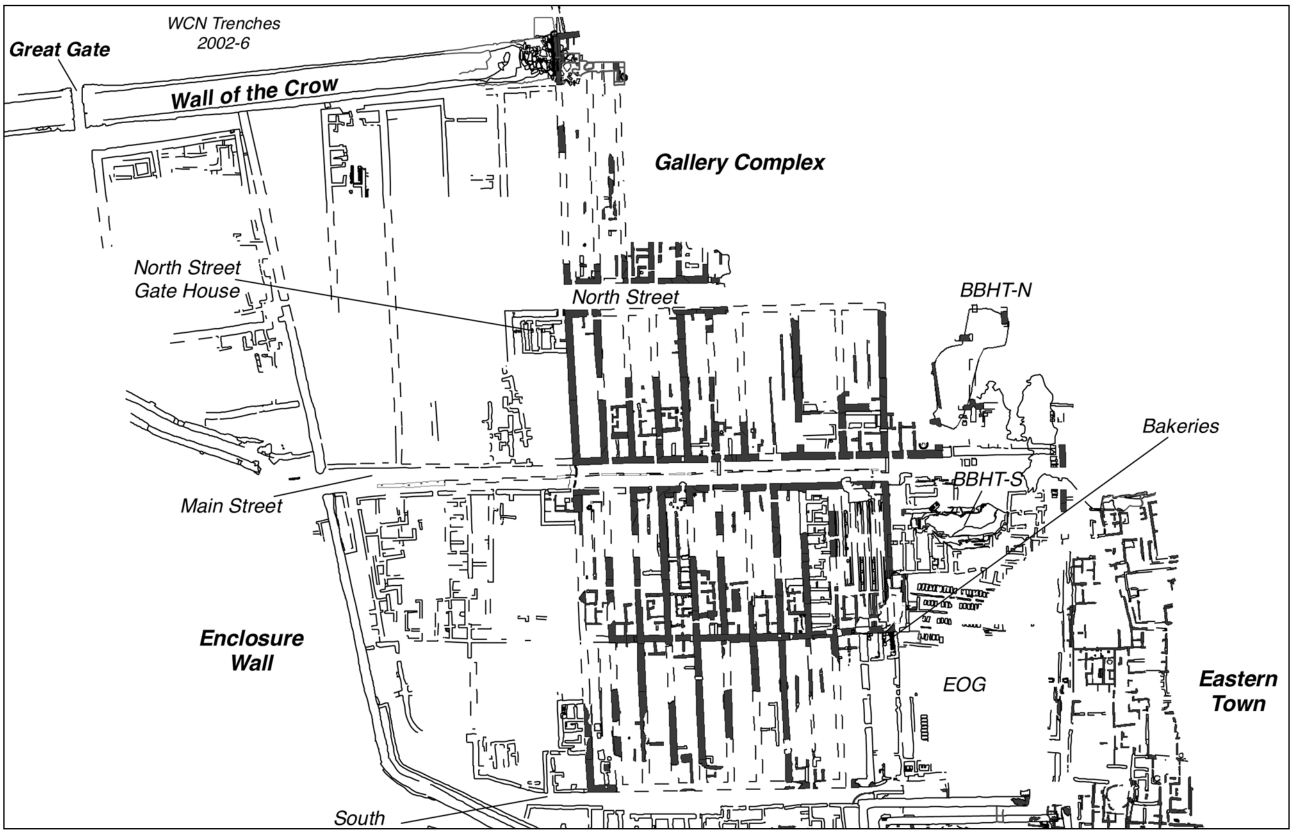

Figure 5.3. Gallery III.4, the North Street Gate House and the Eastern Town (Gallery III.4 is the fourth long gallery from the left in Gallery Set III).

of pigs. Pig fragments outnumber cattle fragments and occur at about the same level as fragments of sheep and goats in the ET. The ET has a higher number of birds than expected.

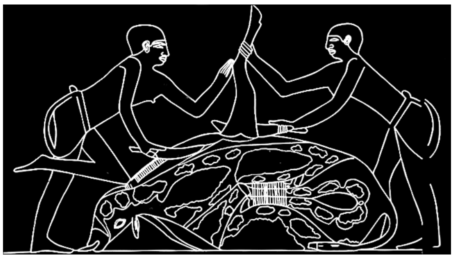

Figure 5.4. Slaughtering scene from the tomb of Tjetu, Giza (After Norman de Garis Davies's unpublished line drawings, by Wilma Wetterstrom after an illustration in Giza Mastabas Vol 4, Mastabas of the Western Cemetery, Pt 1. by William Kelly Simpson. Museum of Fine Arts, Boston. 1980. Fig. 24).

An Explanation of the Patterns

The patterns identified above have meaning in terms of the diet of the individuals occupying the various areas of the site. The diet in Gallery III.4 (a barracks) is the least desirable. It is composed of more sheep and goats than cattle and more goats than in any other area of the site. Goats have a lower body fat ratio than sheep and their meat has fewer calories per gram than sheep meat (Redding 1981). The calorie yield of 100 gm of goat meat is 159 Kcal while the yield from 100gm of sheep meat is 257 Kcal (Pellet and Shadarevian 1970). The Gallery III.4 sample has less desirable fish taxa: *i.e.*, catfish. Catfish, particularly the Nile catfish (*Clarias gariepinus*) are considered a less desirable fish (Redding, interviews with Nile fishermen). The Nile catfish is one of the least expensive fish in the Cairo fish markets. Nile catfish is sold for about 12–15 Egyptian pounds per kilogram ($1.06 to 1.30 per pound). The diet in the Barracks was provisioned. The dominant species were those provisioned and the individuals of the taxa provided are predominately young and male. I have recently re-examined the age data for cattle and sheep and goats in Gallery III.4. 75 % of the cattle in the sample were slaughtered before the age of 18 months and there is no evidence of any animal surviving beyond two years. For sheep and goats 60% were slaughtered before nine months, 81% before 24 months and only 19% survived beyond two years (Redding 2007a). In the barracks (Gallery III.4) sample pigs occur in very low levels as I might expect given the role of pigs in the ancient Egyptian subsistence system as a personal, family based protein resource (Redding 1991). Residents of the barracks, involved in labor, would not have had the time or resources to maintain herds of pigs.

The diet in the NSGH is the most desirable identified to date within the enclosure wall. It is high in cattle. Based on representations in tombs of offerings, Cattle are more desirable than sheep and goats. Cattle meat combines the high levels of protein found in goat meat and the high levels of fat found in sheep meat (Pellet and Shadaverian 1970). The barracks sample is high in fish and particularly the highly desirable Nile Perch. In tomb representations of fish being carried as offerings the Nile perch (*Lates niloticus*) is the most frequently illustrated with catfish rarely seen (*e.g.*, Tomb of Ti at Saqqara). Nile perch is highly esteemed and is the most expensive Nile fish in the fish markets of Cairo. I purchased one recently for 42 Egyptian pounds per kilogram; almost three times the cost of a Nile catfish. Indeed, while I have not fully tested this yet, a correlation seems to exist in the site between the occurrence of cattle and perch. This cattle-perch complex seems to be associated with control areas within the Gallery Complex (inside the enclosure wall) and the Western Town. The sample from the NSGH is high in birds. The diet in the NSGH was provisioned but was substantially better than the diet of the barracks residents. The taxa are those provided by the central authority and are, predominately, young and male. As one might expect pigs occur in very low levels.

The ET diet is not the result of provisioning. The first reason to suspect this is the importance of pigs in the area. Pigs occur in their highest levels on the site in the ET sample. The ratio of sheep-goat to pig is almost identical to that for Kom el-Hisn, which is a small village, producing site in the Nile Delta (Redding 1991). The high levels of pigs suggest that the individuals in the ET were engaged in subsistence procurement activities. The ratio of sheep to goat is higher than expected in the ET, in fact, although the sample is small, no fragments that can be ascribed to goat have been identified. This would suggest that either the residents of the ET had preferential access to sheep from the flocks brought in for provisioning or that they were obtaining sheep from a different pastoral system. A quick test is to examine the age structure of the sheep in the ET. If it is similar to that of the Gallery Complex then the residents of ET were probably receiving preferential access to sheep from the herds brought in to provision the galleries. If the age structure is substantially different then the residents of ET were probably receiving their sheep from a different pastoral system. Again the sample is small but all of the phalanges (n=5) and distal metapodials (n=3) are fused. There is no evidence of any sheep under the age of two years. This age structure is the antithesis of the age structure for the Gallery Complex.

The Pottery Mound

In the winter of 2006 we excavated an area of the WT, lying between two large structures, that we named the Pottery Mound (PM). I have added this section to the paper after it was presented in Mexico City, Mexico in 2006, because the fauna from the PM contributes in an interesting way to the central argument. The series of features that compose the PM appear to represent a discrete period of dumping that formed a small mound. This mound covered about 80 square meters and was less than 1 meter in depth at the center and tapered off towards the edges. We excavated two of the four squares that the PM occupied. The PM contained massive amounts of pottery and bone. In one feature of the PM, 21557, the amount of bone was so large I selected a random, 50% sample. In this sub-sample I examined from the two squares I recorded 27,122 bone fragments.

Most of the bone fragments from feature 21557 are from mammals; 26015. Of the total mammal, 936 could be identified as cattle, 69 as sheep-goat, 6 as pig, 6 as gazelle and one as a leopard. The ratio of cattle to sheep-goat is 13.6:1. Given a differential in meat yield that favors cattle, 8–10:1, sheep and goat are unimportant in the diet of the individuals contributing their garbage to the PM. This suggests the garbage deposited in the PM comes from individuals that had preferential access to cattle. The ratio of 13.6:1 cattle fragments for each sheep-goat fragment is the highest for any area of the site. The long bone fusion data indicate a very early average age of slaughter. I recorded the state of fusion on 178 cattle elements and only one, a calcaneum, was fused. Unfortunately, I had no distal humerii, proximal radii or scapulae (see discussion on absence of fore limb elements below), which fuse in the first year of life. The earliest fusing elements I had were the phalanges and the distal metapodials. They are all unfused, indicating that no animal survived beyond 18 months of age. However, many of the elements, the astragalii and distal femurs in particular, were very porous and the compactum very thin. This suggests an even younger age of slaughter for the cattle than 18 months. I estimate the average age of slaughter as less than 8–10 months.

The most curious aspect of the cattle remains in the feature 21557 sample is the distribution of fragments from hind versus fore limbs. The expected ratio of hind to fore limb fragments, if both hind and fore limbs are contributing equally to the sample, is 1.1:1. This is based on a model I have established for fragmentation. The observed ratio is 36.1:1. The sample is biased towards representation of the hind limb, indeed, I identified over 36 hind limb fragments for each 1 fore limb fragment. This is significant to the 0.001 level. How do we explain this odd pattern? In all the Old Kingdom slaughter scenes in tombs, cattle are trussed up with the hind limbs tied. They then force the cattle to the ground and the fore limbs are cut off with a knife under the scapula (Fig. 5.4). I have examined scenes of cattle cuts being carried as offerings in Old Kingdom tombs at Saqqara and Giza. The offerings represented are exclusively fore limbs (Fig. 5.5). Perhaps what we have in the PM are the high quality "left-overs" from offerings.

Another unique find in the PM are two teeth from the leopard, *Panthera pardus*. The skin of the leopard, with head attached, was worn in the Old Kingdom by high officials, frequently royal sons (Redding 2007b).

The other class of material culture from the PM, other than the fauna, that held surprises was the fragments of seal impressions: broken sealings. Over 1190 registered seal impressions have been examined. They bear titles that

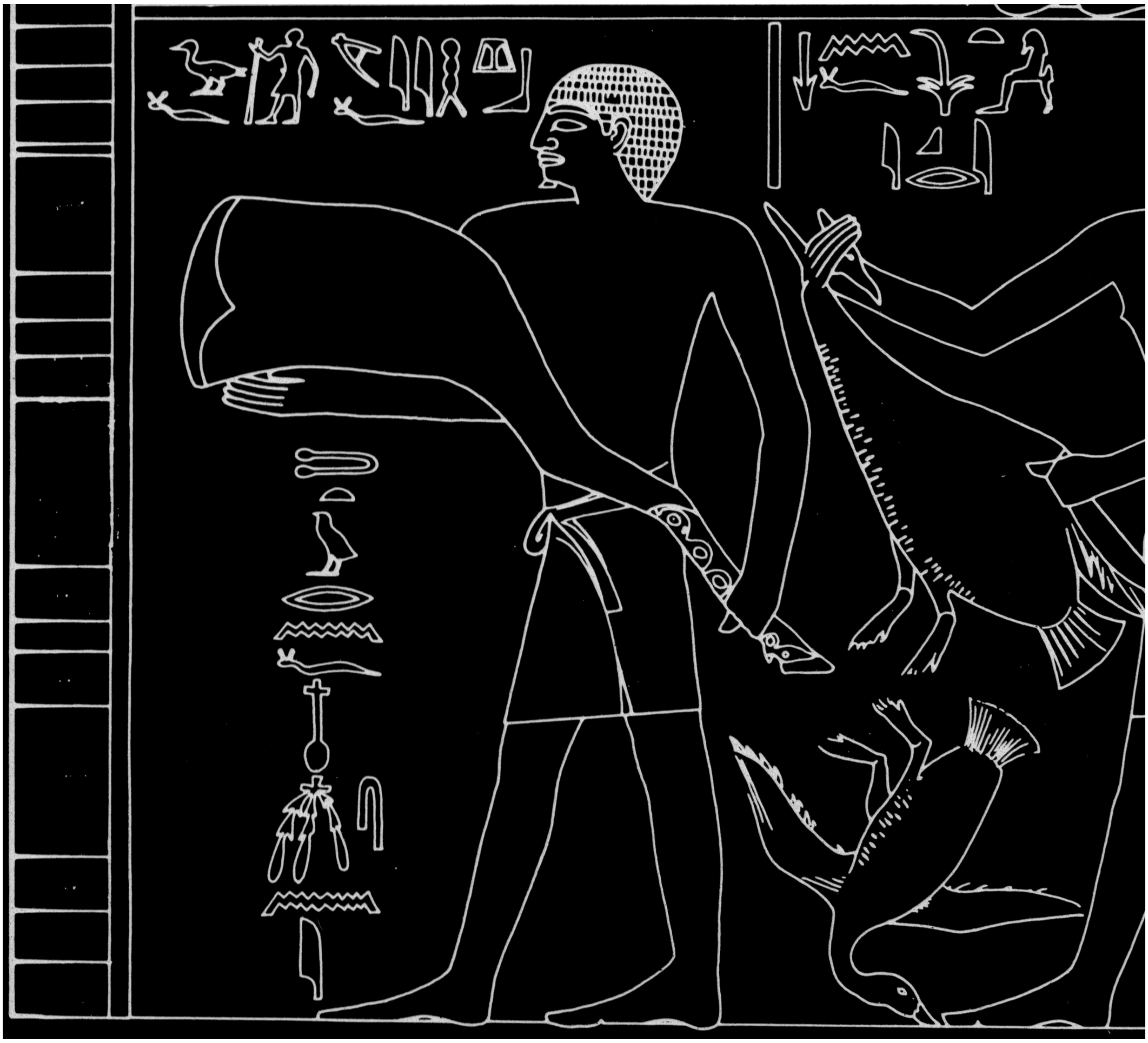

Figure 5.5. Offering scene from the tomb of Tjetu, Giza (After Norman de Garis Davies's unpublished line drawings, by Wilma Wetterstrom after an illustration in Giza Mastabas Vol 4, Mastabas of the Western Cemetery, Pt 1. by William Kelly Simpson. Museum of Fine Arts, Boston. 1980. Fig. 24).

suggest they come from the highest level of Old Kingdom administration; *e.g.*, Scribe of Royal Documents, Scribe of Royal Document Box, Scribe of Royal Works, and Scribe of Royal Lessons. This suggests that the material dumped in the PM comes from high status areas of the site.

The identification and analysis of the fauna from the PM continues and the patterns in 21557 are confirmed by samples from other features in PM. The PM deposit is concentrated garbage from an elite area of the site (WT). The residents were either opening containers from high-ranking individuals or the high-ranking individuals were residents of the area. The residents had preferential access to cattle at levels not found at any other area on the site. The cattle that were consumed were all very young. They also had preferential access to wild fauna (Fig. 5.2). Further, they were also consuming more geese and ducks then anywhere on the site (note the geese in Fig. 5.5).

Summary and Conclusion

The economic infrastructure that supported pyramid construction at Giza is clearly complex. I am in the process of elucidating the animal portion of the subsistence economy while others work on the plants. What is apparent is that the workers inhabiting the gallerys (barracks) were provisioned. That is, all of their food was provided and they were not involved in any subsistence activities. Within the gallery complex, higher status individuals charged with security and overseeing the work, while still provisioned, were receiving more desirable types of meat.

Residents of the Eastern Town were not provisioned and were involved in subsistence activities. They kept pigs and either had access to flocks of sheep or traded with local shepherds for sheep. Interestingly, grinding slabs are found almost exclusively in the Eastern Town. The residents of the Western Town were probably an elite that, although provisioned, had access to the highest status meat resources and wild fauna. Residents that contributed garbage to the PM were very high status and received preferential access to hind limbs of very young cattle, probably the remnants of offerings.

A picture emerges of a well-organized subsistence economy controlled by the central authority and dedicated to feeding a large number of workers and elite. Status was reflected in the diet. This must have impacted regional production and created an economic system whose goal was maintaining a surplus and transferring that surplus to a central locality. The development of a model for this Old Kingdom economy will provide us with a tool to test the bases of decision making at a local, regional and central level. This should lead to a better understanding of the selective pressures operating on human subsistence systems in developing complex societies.

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6. Chiefly Fare or Who's Feeding the Cacique? Equality in Animal Use at the Tibes Ceremonial Center, Puerto Rico

Susan D. deFrance

The site of Tibes is a large ceremonial center located on the Portugués River near the south coast of Puerto Rico. The site was founded as a small village sometime between AD 300–400. These horticulturalists practiced tropical gardening and also hunted, fished, and collected a variety of shellfish from the coast approximately 8 km away. The site underwent a major political and social transformation from a simple village to a civic-ceremonial center sometime after AD 900 as evidenced by changes in site architecture including the construction of a large ball court and various plazas. Excavations produced vertebrate and invertebrate faunal remains that span the period of political transformation. The zooarchaeological assemblage consists of dietary staples that were available locally from the coastal setting and the river. Also present are the remains of the non-indigenous guinea pig, an animal originating in the Andes that was introduced to Tibes from another Caribbean location late in the site occupation. This research examines how vertebrate and invertebrate faunal resources were used by an emerging ranked prehispanic Caribbean society. Despite the major architectural reorganization and presumed political developments that occurred, many aspects of faunal use remained unchanged through time with few indications of status distinctions in animal use for either food or symbolic purposes. These faunal data suggest that the manipulation of animals for social and political purposes may have taken place relatively late in emerging ranked societies on Puerto Rico or at least after other correlates of ranked society had developed.

Keywords: Tibes Ceremonial Center, Puerto Rico, guinea pigs, Caribbean Ceramic-Age

Introduction

The use of animals by politically hierarchical societies in the Caribbean is a topic that has great potential to elucidate the social and economic transformations that accompanied the rise of inequality in that region. I present a case study for the Caribbean using faunal remains from the Tibes Ceremonial Site, an architecturally elaborate prehistoric site located in southern Puerto Rico that is characterized by ball courts and plazas. The site was initially established as a relatively simple horticultural village between AD 300–400. The site underwent major architectural and spatial reorganization between AD 1000–1200 during which time the communal plazas, ballcourts, and causeways were constructed and a ranked society presumably emerged. Ranked society is defined as hereditary inequality and is often reflected in burial and other material correlates (Marcus and Flannery 1996, 93). The architectural features at Tibes are the earliest and most elaborate prehistoric architecture known on the island. The site was abandoned at approximately AD 1200. The zooarchaeological remains are used to examine whether dietary and social uses of animals reflect the emergence of a stratified Caribbean society.

Ranked Societies in the Caribbean and Potential Aspects of Animal Use

According to late fifteenth and sixteenth century Spanish accounts, the Taíno Indians of the Greater Antilles (specifically Hispaniola) were organized into complex chiefdoms (see Rouse 1992; Keegan 1992; Siegel 1992, 1999; Wilson 1990, 1997). Prior to the rise of the contact period chiefdoms or *cacicazgos* the region was inhabited by middle-range ranked societies (Curet 2003), whose members to varying degrees engaged in tributary economic systems, practiced a rich ceremonial and ritual life, and resided in large village compounds (Rouse 1992; Siegel 1992; Wilson 1990). The ancestors of the Taíno who originated from the Lower Orinoco River Valley dispersed into Puerto Rico and the northern Lesser Antilles by 500 BC (Rouse 1982, 1986, 1992); populations did not settle the Windward Islands until after AD 200 (Keegan 2000). These peoples known as the Saladoid experienced different trajectories of interaction, trade, and political development that resulted in significant regional variation in their cultural, material, and ideological manifestations (Curet 1992, 2003 and references therein; Rouse 1986; Siegel 1992, 1999; Versteeg and Schinkel 1992).

On the island of Puerto Rico the Saladoid culture lasted until approximately AD 800 at which time emerged the subsequent Ostionoid cultural period. Both the Saladoid and Ostionoid periods are subdivided into finer scale temporal and geographic units (Rouse 1982) which continued archaeological research is refining. The archaeological and material changes from one period to another include ceramics, lapidary work, mortuary practices, architecture, rituals, and agricultural practices (Curet 1996, 117). Subsistence changes accompanying this transition have been addressed as well; however, the focus was on identifying evidence for the intensification of resource exploitation, habitats used, and capture methods (deFrance 1989; deFrance *et al.* 1996), not on the possible effects of political shifts on subsistence habits. The Ostionoid period is also viewed as the age during which social inequality originates in the Caribbean (see Curet 1996, 2003; Keegan *et al.* 1998; Siegel 1992, 1999). The Tibes Ceremonial Center was initially occupied during the Saladoid period. The architectural and spatial realignment that took place during the Ostionoid time period are commonly interpreted as evidence for the consolidation of political power and the rise of social inequality (Curet *et al.* 2003; Curet *et al.* 2006). The nature of subsistence changes during this transition at Tibes have not been addressed previously.

The origins and development of stratified, ranked social groups in the region, and Puerto Rico in particular, have been investigated by a number of researchers (Curet 1992, 1996; Oliver 2005; Siegel 1999). In the Bahamas the rise of chiefs and chiefdom village life is attributed to individuals who achieved supravillage influence in circumscribed island settings where long-distance trade, descent rules, and residence patterns interacted to create concentrated spheres of power (Keegan and Maclachlan 1989). Recent emphasis involving Puerto Rican sites is on the role of cosmology and ideology during the Ostinoid period as a driving force. According to Siegel (1999) the original shamanistic control of ritual ceremonies at the village level developed into offices of power when individuals amassed political might through the control and performance of rituals that were multivillage in character (Siegel 1999). Ceremonial space in the form of ballcourts and plazas were the performance venue for communal celebrations in which powerful individuals, eventually chiefs or caciques, mediated between cosmological forces and the here and now. The increase through time in ritual paraphernalia and ceremonial space are viewed as the correlates of increased power (Curet 1996, 120). Elites conducted performances consisting of dance/chant ceremonies in plaza spaces to communicate with cosmological and supernatural forces (*e.g.*, deities, ancestors) (Oliver 2005; Siegel 1999). In order to commune with supernatural forces elites reached hallucinatory states of consciousness induced either through *cohoba* (a narcotic snuff made from the crushed seeds of the cojóbana [*Anadenanthera peregrina*] tree) (Newsom and Wing 2004, 4) inhalation or repeated external stimulation to induce altered states of consciousness (Oliver 2005; Siegel 1999). These community events also involved competition through ball games. At European contact the economic role of chiefs in the collection and redistribution of food and craft materials is well documented (Las Casas 1971; Martyr D'Anghiera 1970 cited in Deagan 2004, 600). The development of chiefly power occurred through time from individuals to their families and later to entire lineages, thus solidifying rank and power (Siegel 1999).

The social inequality that emerges in the Caribbean can also be examined in relation to the economic and symbolic use of animals. In general, as social stratification develops some members of society rise to positions of status that permit them to alter economic relationships including those related to animals and the food that animals provide. In all societies animals are important for their dietary contributions as well as for symbolic value. In prehistoric ranked societies some individuals attained positions in which they are no longer involved in the task of acquiring animals for their own dietary needs or symbolic use. In order to support them and the expanding retinue of ranked members of society, emerging elites commonly mandated or proscribed the systematic provisioning of food (or symbolic) animals by either commoners or their supporters. One way in which elites maintained their power was through the alteration of the economic system; elites became active in the acquisition, redistribution, and control of food resources including both plants and animals. At the time of Spanish contact chroniclers identified the political organization on Hispaniola as redistributive chiefdoms in which chiefs oversaw the collection and distribution of food and craft materials (Deagan 2004, 600). Whether the acquisition of surplus, particularly food animals, was a characteristic of sites that underwent architectural transformations and the presumed rise of ranked society can be examined using the zooarchaeological record from Tibes.

In the Caribbean elites may have derived power from non-material conditions such as through mediation with the cosmological forces (Curet 1996; Oliver 2005; Siegel 1999). However, economic, hence dietary, support of the elites would have been present in some form. I am not arguing that Caribbean chiefs emerged during the Ostionoid period purely to serve managerial roles, but rather, that regardless of the method through which they consolidated power, once individuals (and their families and lineages) were in positions of power they may no longer have been food producers (*e.g.*, fishermen, foragers, farmers, shellfish collectors). As such, one of their roles would have been to oversee the collection and redistribution of foods, certainly for their own consumption and to provide feast foods for people assembled at ceremonial events, labor events (*e.g.*, architectural construction) as well as to promote food security among the general population from which they acquired or demanded their own subsistence needs. While ceremonies may have appeased the ancestors and deities, cacique power and societal cohesiveness was probably also augmented through the social obligations that were established with the collection and provisioning of meat and other foods, particularly in feasting venues (see Adams 2004; Jackson and Scott 1995; Kirch 2001). Therefore, the political economic activities that the chief oversaw would have benefited the office of the chief and the society as a whole.

Researchers have recognized that archaeological linkages have not been established between subsistence systems and ideological factors of social organization in the Caribbean (Siegel 1999, 210). The great variability in subsistence habits both diachronically and spatially has been recognized (Carlson 1999; deFrance *et al.* 1996; Newsom and Wing 2004; Wing and Wing 1995; Wing and Reitz 1982); however, only a few studies have linked zooarchaeological variability explicitly with issues of social complexity (Antczak 1999; Deagan 2004; Keegan *et al.* in revision; Oliver and Narganes Storde 2005). Studies of how subsistence practices relate to the social uses of food are rare (Keegan *et al.* in revision). Few studies have used faunal data to address questions either related to the "anthropology of food" or to the contrasts in consumption patterns and ritual uses of animals. In their study of faunal remains from a late prehistoric Puerto Rican mortuary cave site and habitation site in northwestern Puerto Rico Oliver and Narganes Storde (2005) found that river crabs (buruquena, *Epilobocera sinuatifrons*) were used for mortuary ceremonial feasts at the cave site while animal use at the habitation site was more mundane and did not include the use of the river crab for food. The analysis of faunal remains from the precontact and 15th century post-contact Taíno village of En Bas Saline on the north coast of Hispaniola indicates that the elite residence (chiefly house on a central mound) had access to a greater variety and diversity of preferred fauna than commoners as reflected in high measures of diversity, but low measures of taxonomic equitability indicating elite food preference for parrotfish, snappers, jacks, sea bass, and grunts (Deagan 2004, 618). In contrast, commoners had much less varied diets and they consumed large quantities of small-sized butterfly fish, a fish not eaten by elites. Precontact elites also consumed greater quantities of hutias, a small terrestrial Caribbean mammal (Deagan 2004; Newsom and Wing 2004; Wing 1989, 2001). Pits of food waste in the plaza at En Bas Saline indicate pre-contact community wide feasting while a post-contact burial is associated with funerary feasting (Deagan 2004, 610, 615, 619). Both of these ritual contexts are similar to elite residence in that they contain high species diversity but low equitability indicating the ability to accumulate a variety of fauna along with a predilection for select reef species. Carlson (1999) documented the exploitation, processing, and consumption of abundant sea turtles and other large marine vertebrates by a colonizing population of Ostionoid-age peoples at the site of Coralie on the island of Grand Turk in the Bahamas. These colonists encountered a pristine island habitat where they were able to provide for their own needs and possibly harvest fauna from this outlying site to provision elites on Hispaniola. The question of whom engaged in provisioning, storage, and transport of food animals within Caribbean hierarchical societies is not well understood.

These studies indicate that relatively little is known concerning the probable diversity of animal use in the Caribbean that was related to status, ritual, ornamentation, and tribute. Although analysis of ethnohistorical accounts indicates that fish and turtles were kept live in weirs, hutias were captured and penned for ceremonial use, parrots were kept, and iguana, manatee, and dog meat were delicacies that only chiefs could consume (Loven 1935; Rouse 1992, 13), empirical archaeological evidence for these practices has not been identified. Therefore, we do not know the accuracy of these descriptions or if these were practices were limited to only some islands and settings. Both more archaeology and ethnohistorical research are needed to construct probable hypotheses related to animal use. And while a more thorough examination of the ethnohistorical record of food use could potentially identify some uses of animals including ceremonial and ritual practices, especially for late prehistory I concur with the cautionary recommendations of Curet (2003, 21) regarding the "the Tyranny of Ethnohistory" and its primacy as a source of information (also see Deagan 2004; Keegan and Maclachlan 1989; Wobst 1978). Because significant variability has been documented through archaeology, I would also caution against using the ethnohistorical record that is limited to 16th century Hispaniola for making generalizations of animal use throughout the region and particularly for earlier time periods than those documented in these accounts (see Newsom 1993 for similar caution regarding ethnohistorical accounts and the archaeobotanical record). Despite this caveat, the ethnohistorical record can provide ideas of animal use that can be independently corroborated with zooarchaeological data.

Considering the cultural trajectory of power in the Caribbean and that the rise in power is characterized by the construction of public architecture and by significant changes in material culture (*e.g.*, ceramics, stone bead working, mortuary patterns), one would expect that the uses of animals would also undergo significant changes as inequality developed. How might animals have been used in stratified Caribbean society? Because only a few Caribbean studies correlate food animals with status or elite behavior as discussed above (see Antczak 1999; Deagan 2004; Keegan *et al.* in revision; O'Day 2002; Oliver and Narganes Storde 2005), I also draw on evidence of elite animal use in chiefdom or ranked societies elsewhere in the Americas including Panama, the Eastern United States Mississippian and late prehistoric cultures, and early ranked societies in Mesoamerica.

In some cases emerging elites restricted the use (*e.g.*, consumption, ritual or ceremonial use, personal adornment, mortuary use) of certain animals or their products thereby creating status for particular animals (Cooke 2004; Oliver and Narganes Storde 2005). In addition to dietary uses the archaeological record might contain animals of supra-culinary value or animals that are of poor food value (little food), but which possess some valued characteristics such as colorful plumage, large teeth, claws (Cooke 2004; Kelly 2001). Non-indigenous animals might also indicate trade or external contacts (Antczak 1999; Newsom and Wing 2004). People may also have sacrificed animals that were related to cosmological forces and interred them as complete animals (Haller *et al.* 2006). Animal remains might reflect the provisioning and transport of large quantities of meat and food for onsite consumption including such abundance that meat spoilage occurred (Kelly 2001) or that elites had access to the better cuts or portions (Jackson and Scott 2003). Even though indigenous large terrestrial mammals such as sloths were extirpated by Archaic-age human occupation over 4000 years ago (Steadman *et al.* 2005), the skeletal remains of other large vertebrates, such as manatee, monk seals, sea turtles, large fish, might indicate that elites had access to prime meaty portions or larger-sized animals. For example, articulated mid-sections of large fish vertebrae might indicate that some individuals consumed high value fish steaks (see Luer 2007). High measures of faunal diversity and species richness may indicate that elites were able to dictate their taxonomic preferences and that they were able to maintain diets and animal use characterized by abundance and variety (Deagan 2004, 616–618). Caches of seemingly mundane foods or staples (molluscs, abundant fishes) might indicate that people (supplicants, commoners) brought food to a site as a demonstration of abundance (Leach 2003). Caribbean practices may have involved culinary preferences such as those documented in Pacific island ethnoarchaeology such as a preference for fish of certain colors (Jones 2006, in press) or elite use of higher value reef fishes along with a preference for fatty or greasy food animals (Kirch and O'Day 2003).

The contexts of animal use and disposal are also very important. Differences should be evident in elite versus commoner everyday or private meals provided that residential distinctions can be discerned (Deagan 2004; Jackson and Scott 2003; Kirch and O'Day 2003). In regard to the ritual consumption of animals, feasting contexts and its political and social functions associated with feasts also need to be clearly identified or the concept of feasting looses utility. As Siegel (1999) has suggested for the nature of ceremonial performance, the party of invitees and participants may have become more exclusive through time, so too might politically motivated feasts or feasts may have taken on multiple roles. The use of food in private rituals, such as funerary meals, also needs to be distinguished by context as well as conjecture regarding the participants. Animal offerings/sacrifices and their interment can provide insights into the designation of ritual space. In regard to large ceremonial sites with elite residences, the patterns of animal use at centers need to be compared with patterns found at satellite sites to determine if hierarchical uses of animals were present.

Despite the great variety of ways in which status use of animals and elite consumption patterns potentially can be documented, I demonstrate in this chapter that very few of these potential zooarchaeological correlates of inequality are present in the Tibes faunal data. Faunal data when examined both diachronically and spatially do not indicate significant distinctions in animal use with the exception of the presence of the imported guinea pig, an Andean mammal that was introduced to the Caribbean during Ostionoid times (*i.e.*, after AD 600). I explore the supposition that differential animal use was not a means (or was only minimally a means) through which status or rank was recognized at the Tibes Ceremonial Center. I also indicate how future research in and near Tibes might be used to discern possible variability in animal use that is related to social status or to confirm the absence (or minimal presence) of zooarchaeological correlates of status or elite patterns of animal use during the Ostionoid period on the south coast of Puerto Rico.

Puerto Rico and Tibes Habitats

Puerto Rico is the smallest and eastern most island of the Greater Antilles. The island is dominated by an east-west mountain chain along with distinct northern and southern vegetation and rainfall regimes. The south coast of Puerto Rico has a relatively narrow coastal plain (8 miles; 12.9 km wide) and is more arid than the northern side of the island. The Caribbean Ocean is characterized by lower energy shorelines with greater occurrences of sandy shores as opposed to the rocky shorelines that occur on the Atlantic coast on the north side of the island. Marine invertebrates are similar between the north and south; however, the molluscan fauna varies significantly.

The Tibes Ceremonial Center is located on the east side of the Portugués River in the foothills of the cordillera (Fig. 6. 1). Although the site is approximately 8 km from the coast, it conforms to the common settlement pattern identified for other Saladoid occupations on the island (Siegel 1993). The inland setting and riverine habitat provided access to a great range of habitats and easy navigation via the river to and from the coast. Horticultural lands could be cultivated near the site, but diverse coastal habitats including estuaries, reefs, and open water habitats were nearby as well. There are other sites that are contemporaneous with Tibes on the south coast; however, the social relations between these sites are not well understood. The settlement relationship of Tibes to possible satellite or habitation sites in the region is the subject of ongoing and future research (see Torres 2001, 2006). Thus far, there are no indications of adversarial relationships with other sites or centers, such as territorial or defensive features at Tibes; however, power struggles between competing polities are believed to have developed through time (Siegel 1999).

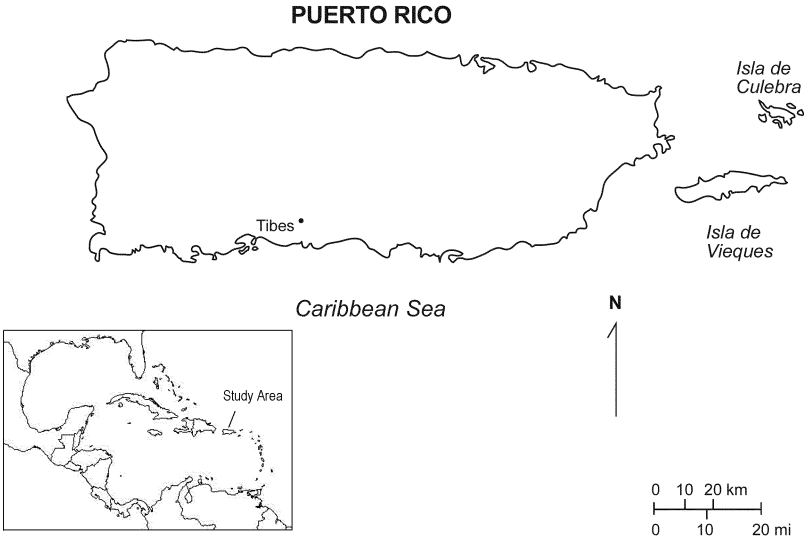

Figure 6.1. Location of Tibes on the south coast of Puerto Rico

The Tibes Site and Faunal Assemblage

Excavations at Tibes beginning in 1995 under the direction of Antonio Curet and Lee Newsom were geared toward understanding the archaeological manifestations related to the rise of political inequality with data from the household and community levels. The goal of these investigations is to understand how and why Tibes underwent a major social, architectural, and political reorganization sometime after AD 900 (Curet *et al.* 2006). Between 1995 and 2003 researchers excavated deposits dating to both the earlier Saladoid and the later Ostionoid time periods, with more contexts associated with the later occupation. The purpose of excavations was to identify the occupational history of the site, the variation in site contexts (*e.g.* residential, ceremonial deposits), and the nature of civic and ceremonial architecture at the site. Excavations included shovel tests, 1 × 1 m, 2 × 2 m, contiguous trenches, and block excavations measuring 3 × 3 m. The archaeological contexts consist of five domestic trash middens, evidence of a probable structure of undefined function, two burial areas dating to the Saladoid period, and deposits of rock rubble and refuse probably associated with construction of the plazas and ball courts (Curet *et al.* 2006). The plaza and ballcourt areas appear to have been kept clean as little refuse accumulated near them. There are no discrete contexts that are identified as ceremonial; therefore, the faunal remains are from trash midden deposits dating to either the Saladoid or Ostionoid period. A greater volume of material (36.9 cubic meters) is associated with the later Ostionoid time period as compared to 7.3 cubic meters of excavated volume for the earlier Saladoid contexts. Additional excavations planned for the future may elucidate functional variation across the site.

Faunal remains were recovered with either 1/4" (6.4 mm) or 1/8" (3.1 mm) mesh. Volumetric samples from selected contexts (5 or 10 L) were also screened with 1/16" (1.8 mm). The faunal analysis consisted of the identification of both vertebrate and invertebrate remains using osteological and malacological comparative materials at the University of Florida and published sources on molluscan fauna (deFrance *et al.* 2010; Schmid 2007). Using analytically combined proveniences specific to time periods and spatial units, the data recorded include specimen counts, MNI, bone/shell weight, and calculated edible meat weights.

The Tibes faunal assemblage contains 3868 vertebrate specimens representing 272 MNI and 14577 invertebrate specimens accounting for 2931 individuals. The vertebrate taxa consist of 7 species of mammals, 8 species of birds, 4 reptiles, 1 amphibian, 2 cartilaginous fishes, and thirty-two taxa of bony fishes. The invertebrates consist of sixty-nine taxa (3 taxa of crustaceans, 4 terrestrial gastropods, twenty-five marine gastropods, and thirty-seven species of bivalves). All of these are considered edible with the exception of very small reptiles (small lizards), the amphibians, and three of the terrestrial gastropods. The taxonomic composition for the two time periods is summarized in Table 6.1. Summaries by class of NISP and MNI are presented in Table 6.2. I present a general summary and then highlight significant differences between the two time periods in faunal use. More detailed quantitative information is presented in deFrance *et al.* (2010).

The economy of Tibes was horticultural with a substantial amount of protein derived from a variety of marine vertebrates and invertebrates. To a large extent patterns of exploitation established with the Saladoid continued into the Ostionoid with the addition of new fauna. People exploited shallow marine waters with either sandy or muddy substrates as well as reef habitats. There are abundant remains of reef (parrotfish, grunts, angelfishes, black durgon, other triggerfishes, boxfish, jacks, grouper, snappers, wrasses, squirrelfish) and inshore fishes (snook, needlefishes, bonefish, the shad and herring, mojarra, porgies, and the pufferfish) as well as scant remains of pelagic fishes, such as tuna. Probable riverine fish are also present including mullet, big-mouth sleepers, gobies, and eels. Sharks and at least one eagle ray are present. Sea turtles and a probable freshwater turtle are present, but not abundant.

Taxon	Common Name	Saladoid	Ostionoid
cf. *Heteropsomys* sp.	spiny rat	*	
Oryzomys sp.	rice rat	*	
Cavia porcellus	guinea pig		*
Isolobodon portoricensis	hutia	*	*
Nesophontes sp.	insectivore		*
Rodentia uid	unidentified rodent	*	*
Canis familiaris	dog	*	
cf. *Trichechus* or *Monachus*	possible manatee or seal	*	
Ardeiformes	herons and bitterns		*
Dedrocygna arborea	West Indian tree duck		*
Anatidae (lg)	ducks		*
Columba leucocephala	white-crowned pigeon		*
Columba squamosa	scaly-naped pigeon		*
Columba spp.	dove	*	*
Zenaida aurita	zenaida dove		*
Zenaida sp.	dove	*	
Columbidae	doves, pigeons	*	
Fulica sp.	coot		*
Porphyrula martinica	purple gallinule		*
Amazona cf. *vittata*	Puerto Rican parrot		*
Diploglossus sp.	anguid lizard		*
Lacertilia	lizards		*
Cheloniidae	sea turtles	*	*
Testudines	turtles	*	*
Colubridae	non-poisonous snakes		*
Serpentes	snakes		*
Anura	frogs, toads		*
Carcharhinidae	requiem sharks	*	*
Aetobatus narinari	spotted eagle ray		*
Lamniformes			*
Elops saurus	ladyfish		*
Megalops atlanticus	tarpon	*	
Albula vulpes	bonefish	*	*
Anguilla rostrata	freshwater eel		*
Anguilliformes	eels		*
Clupeidae	shad, herring, sardines		*
Strongylura sp.	common needlefish		*
Tylosaurus sp.	houndfish		*
Belonidae	needlefishes	*	*
Exocoetidae	flyfishes		*
Holocentrus sp.	squirrelfish	*	*
Centropomus sp.	snook	*	*
Centropomidae	snooks		*
Epinephalus sp.	grouper	*	*
Mycteroperca sp.	grouper		*
Serranidae	grouper	*	*
Caranx sp.	jack	*	*
Selene vomer	lookdown		*
Carangidae	jacks	*	*
Lutjanus sp.	snapper	*	*
Ocyurus chrysurus	yellowtail snapper		*
Lutjanidae	snapper	*	*
Diapterus plumieri	stripped mojarra	*	
Anisotremus sp.	grunt		*
cf. *Anisotremus surinamensis*	black margate		*
Haemulon sp.	grunt	*	*
Haemulidae	grunts		*
Calamus sp.	porgy		*

Table 6.1. Species identified from the 1996–2003 excavations at the Tibes Ceremonial Center (continued over the next two pages).

Taxon	Common Name	Saladoid	Ostionoid
Pomacanthus sp.	angelfish		*
Mugil sp.	mullet	*	*
Mugilidae	mullets	*	*
Halichoeres sp.	wrasse		*
Scarus sp.	parrotfish	*	
Sparisoma viride	spotlight parrotffish	*	*
Sparisoma sp.	parrotfish		*
Scaridae	parrotfishes		*
Gobiomorus dormitor	big-mouth sleeper	*	*
Eleotridae	sleepers	*	*
Gobiidae	gobies	*	*
Sphyraena sp.	barracuda		*
Sphyraenidae	barracudas		*
Thunnus sp.	tuna and albacore	*	*
Scombridae	tuna, mackerals	*	*
Melichthyes niger	black durgon		*
Balistidae	triggerfishes		*
Ostraciidae	boxfishes		*
Diodon sp.	porcupinefish		*
Diodontidae {Tetraodontidae}	puffers or porcupinefishes		*
Cardisoma guanhumi	blue land crab	*	
Cardisoma sp.	land crab	*	
Gecarcinidae	land crabs	*	*
Callinectes sapidus	blue crab		*
Decapoda	crabs		*
Bulimulus sp.	--------	*	*
Polydontes spp.	--------	*	*
Caracoles sp.	caracol		*
Megalomastoma croceum	--------	*	
Gastropoda uid (terrestrial)	unidentified land snail	*	*
Acmaea sp.	limpet		*
Acmaeidae	limpets		*
Arene sp.	cyclostreme		*
Astraea sp.	star-shell	*	
Lithopoma caelatum	carved starsnail	*	*
Lithopoma tuber	green starsnail		*
Lithopoma sp.	starsnail		*
Turbo castanea	chestnut turban		*
Turbinindae	turbans	*	*
Cittarium pica	West Indian topsnail	*	
Nerita tessellata	checkered nerite	*	?
Nerita sp.	nerite		*
Neritina clenchi	nerite	*	
Neritina virginea	virign nerite	*	*
Neritina spp.	nerite	*	*
Neritidae	nerites	*	
Turritella variegata	variegate turretsnail	*	*
Turritella sp.	turretsnails	*	
Crepidula aculeata	spiny slippersnail	*	*
Crepidula sp.	slippersnail		*
Crucibulum auricula	West Indian cup-and-saucer		*
Cerithium algicola	middle-spined cerith	*	*
Cerithium eburneum	ivory cerith		*
Cerithidae	ceriths		*
Cymatium sp.	triton		*
Strombus gigas	Queen conch	*	?
Strombus pugilus	West Indian fighting coch	*	*
Strombus sp.	conch	*	*
Cyphoma sp.	cyphoma	*	

Table 6.1. Species identified from the 1996–2003 excavations at the Tibes Ceremonial Center (continued).

Taxon	Common Name	Saladoid	Ostionoid
Natica canrena	moonsnail		*
Cassis tuberosa	Caribbean helmet	*	
Charonia variegata	trumpet triton	*	
Murex (Chicoreus) brevifrons	West Indian murex	*	*
Murex sp.	murex		*
Phyllonotus pomum	apple murex	*	
Muricidae	rocksnails/murex	*	*
Fasciolaria tulipa	true tulip		*
Oliva reticularis	reticulated olive		*
Oliva spp.	olive		*
Brachiodontes sp.	mussel		*
Mytilidae	mussels		*
Anadara baughmani	baughman ark	*	
Anadara brasiliana	incongruous ark		*
Anadara chemnitzi	chemnitz ark	*	
Anadara lienosa	ark	*	*
Anadara notabilis	eared ark	*	*
Anadara ovalis	blood ark	*	*
Arca imbricata	mossy ark	*	*
Arca zebra	zebra ark	*	*
Arca spp.	ark	*	
Arcidae	arks	*	*
Pinnidae	pen shell		*
Amusium laurenti	scallop		*
Argopecten gibbus	Atlanic calico scallop	*	*
Pectinidae	scallops	*	
Plicatula gibbosa	kitten's paw	*	*
Spondylus americanus	Atlantic thorny oyster		*
Crassostrea rhizophorae	Caribbean oyster	*	*
Crassostrea virginica	eastern oyster		*
Crassostrea sp.	oyster		*
Lopha frons	frons oyster		*
Ostrea sp.	oyster		*
Ostreidae	oysters		*
Anodontia alba	buttercup lucine	*	
Codakia orbicularis	tiger lucine	*	*
Lucina pectinatus	thick lucine	*	*
Lucinidae	lucines		*
Chama sarda	red jewelbox		*
Chama spp.	jewelbox	*	*
Arcinella arcinella	jewelbox		*
Pseudochama sp.	false jewelbox		*
Chamidae	jewelboxes		*
Trachycardium muricatum	yellow cockle	*	*
Trachycardium sp.	cockle		*
Solen obliquus	oblique jackknife clam		*
Tellina fausta	favored tellin		*
Tellina radiata	sunrise tellin		*
Tellina spp.	tellin		*
Donax denticulatus	coquina		*
Donax sp.	coquina		*
Tagelus plebeius	stout tagelus		*
Mytilopsis sp.	falsemussel		*
Anomalocardia brasiliana	carib pointed venus		*
Ventricolaria rigida	rigid venus	*	
Chione cancellata	cross-barred venus		*
Chione granulata	venus		*
Dosinia sp.	dosinia		*
Cirrepedia	barnacles		*
Zooantharia	coral	*	*

Table 6.1. Species identified from the 1996–2003 excavations at the Tibes Ceremonial Center (continued).

Saladoid Contexts

3.1mm samples, vertebrates and invertebrates			2.0mm sample		
	NISP	MNI	NISP	MNI	Total Number of Taxa
Mammals	107	9	0	0	5
Birds	44	3	17	1	2
Reptiles	83	4	1	1	2
Amphibians	0	0	0	0	0
Cartilaginous Fishes	2	2	0	0	1
Bony Fishes	332	44	85	4	17
Crustaceans	13	2	56	2	2
Gastropods	2220	689	58	9	17
Bivalves	2674	490	14	2	16
Total	**5475**	**1243**	**231**	**19**	**62**

Saladoid and Ostionoid Mixed Contexts

3.1mm samples, vertebrates only			2.0mm sample		
	NISP	MNI	NISP	MNI	Total Number of Taxa
Mammals	1	1	0	0	1
Birds	31	2	12	1	1
Reptiles	10	1	0	0	1
Amphibians	0	0	0	0	0
Cartilaginous Fishes	0	0	0	0	0
Bony Fishes	53	9	75	7	9
Total	**95**	**13**	**87**	**8**	**12**

Ostionoid Contexts

3.1mm samples, vertebrates and invertebrates			2.0mm sample		
	NISP	MNI	NISP	MNI	Total Number of Taxa
Mammals	418	26	8	1	3
Birds	111	18	16	3	9
Reptiles	69	12	1	1	5
Amphibians	4	3	0	0	1
Cartilaginous Fishes	7	4	0	0	2
Bony Fishes	2089	109	70	6	30
Crustaceans	190	8	281	4	2
Gastropods	2016	835	178	60	19
Bivalves	4455	802	185	28	34
Total	**9359**	**1817**	**739**	**103**	**105**

These totals do not include fauna identified to taxonomic categories higher than class including Tetrapoda, Vertebrata unidentified, and Mollusca unidentified.

Table 6.2. Relative abundance of taxa by class and mesh size.

Invertebrates include marine bivalves, gastropods, and crustaceans. The most abundant marine bivalves of the thirty-four taxa present are arks, Caribbean oysters, and West Indian Pointed Venus. Very common marine gastropods include variegate turretsnail, nerites, conches along with several other taxa (n=19 total taxa). Only one terrestrial gastropod is considered edible. Remains of blue land crabs as well as numerous remains unidentifiable beyond the family or class level are present. Some of the crustacean remains may be riverine species, but identification was not possible due to the fragmentary nature of the remains.

The terrestrial fauna includes small mammals, particularly non-native rodents (hutia, guinea pig, rice rat), of which the hutia is the most common. Also present are single specimens of a native spiny rat and an insectivore. One dog element was identified as was a possible marine mammal rib. The avian fauna, including doves, parrot, duck, heron, coot, gallinule, are neither diverse nor abundant. Neither reptiles nor amphibians are common in the assemblage. One small-sized lizard and a non-poisonous snake probably do not represent food items while the larger anguid lizard was probably hunted for food. One anuran is present in the later material and is probably a commensal.

The Ostionoid assemblage contains over 9359 specimens that were identifiable at least to class as compared to 5475 for the Saladoid deposits. The Ostionoid contexts contain remains of 105 taxa as compared to 62 for the Saladoid deposits. Differences in sample size between the two time periods accounts for some of the differences in taxonomic richness. Mammals are more diverse for the Saladoid contexts including a greater range of edible rodents, dog, and a possible marine mammal. However, the Ostionoid contexts contain guinea pig remains that were introduced during that later period. The Ostionoid assemblage has greater taxonomic variety in birds, reptiles, cartilaginous and bony fishes, as well as bivalves. The Ostionoid avian fauna includes heron, duck, coot, gallinule, and parrot none of which are present in the Saladoid. The only reptiles present in the Saladoid contexts are turtles, while lizards and snakes as well as turtles are present in the Ostionoid, although probably only one of the larger-sized lizards was of economic importance. A single ray is present in an Ostionoid context. In regards to bony fishes, the Ostionoid sample contains 10 families of fishes that are not present in the Saladoid sample. Some of the greater taxonomic richness (30 *versus* 17 total taxa) is the result of four taxa that could be identified to the species level within genera present in the Saladoid contexts. None of the families added in the Ostionoid period are from new habitats that people had not exploited previously.

The molluscan fauna for the Ostionoid period contains some gastropods not present in the earlier period including starsnail, triton, tulip, and olive snails. Exploited initially, but not present in the Ostionoid are top shell, tritons, and helmets. The bivalves are also more diverse during the later period with use or presence of mussels, pen shell, thorny oyster, jewelbox, tellin, coquina, venus shells, tagelus, and dosinia. Some of these are small-sized epibionts that may have been transported attached to other fauna. Although these differences do not indicate unequivocally that people targeted new marine habitats, the greater taxonomic richness indicates that people collected a wider range of local shellfish through time.

Discussion

The overall patterns of animal use and habitats for exploitation are similar for the two time periods despite the somewhat greater taxonomic richness in the Ostionoid samples. The most significant difference is the addition of the guinea pig. The guinea pig is a native domesticate of the Central Andean region (Wing 1986). People transported guinea pigs through the island archipelago; however, the timing and direction are not known (deFrance and LeFebvre, 2009; Newsom and Wing 2004, 205). Guinea pigs are very rare on Caribbean sites (Newsom and Wing 2004, 204–205; Wing in Quitmyer and Kozuch 1996 for a review of their frequency). At the site of Finca Valencia (NCS 1) site located in northwest Puerto Rico Ostionoid and Chicoid deposits produced abundant remains of (n=98, MNI =20) guinea pigs (see discussion in Quitmyer and Kozuch 1996). Remains of one guinea pig are present at the Rio Tanama site 1 also located on the north coast of Puerto Rico (Carlson 2007). Guinea pig remains have also been found on Hispaniola (Dominican Republic), Vieques, St. John, Antigua, and Curacao (Newsom and Wing 2004:205). Guinea pig remains from the site of Cinnamon Bay on St. John are from late deposits when the site had a ceremonial "structure", but the remains are not identified as being associated with this "caney" or ritual structure (Quitmyer 2003). At none of these other sites have guinea pig remains been from ceremonial contexts or high status deposits. Interestingly, guinea pig remains are not present in the well-studied large sample (n= >60,000 specimens) of faunal remains from the Taino village at En Bas Saline (Deagan 2004; Newsom and Wing 2004, 205).

Guinea pig remains from Tibes consist of eight specimens representing at least four individuals. They occur in four contexts spatially distributed across the site. One context contains four specimens while the others only contain 1 or 2 elements. Guinea pig remains were treated as other food refuse in terms of discard patterns; they are present with various other food animal refuse. The high specimen count to MNI ratio is the result of diagnostic mandibles in different contexts. Postcranial elements of immature guinea pigs and fragments are difficult to distinguish from hutias. Guinea pig remains do not occur in contexts that can be considered ceremonial nor are they associated with "elite households"; however, their exotic status, late introduction, and overall rarity strongly suggest that their consumption would have been restricted.

The overall rarity of guinea pigs throughout the Caribbean may indicate that they also served non-culinary purposes such as offerings as they did in the Andean past (Rofes 2000; Sandweiss and Wing 1997) or for traditional curing and divination as they are today (see Archetti

1997; Gade 1967; Morales 1995). Future research should be aimed at determining if guinea pig remains occur in ceremonial, non-domestic contexts that would suggest their use in rituals. Their rarity in general may indicate that Pre-Columbian Caribbean peoples used guinea pigs for various rituals (Newsom and Wing 2004, 205). Since they are not abundant throughout later prehistory, these animals apparently were not released to form feral breeding populations nor were they a new protein source for expanding populations. The introduction of guinea pigs has trade and contact implications that are not well understood. Guinea pigs arrived in Puerto Rico through human carriers; however, whether these immigrants also transmitted other cultural traits to Tibes or elsewhere in the Caribbean is not known. The Ostionoid period is characterized by much cultural change; however, local versus exogenous causation remains poorly understood (Keegan 2006). Only with more archaeological research of contexts with defined function and status can the role of the guinea pig in the prehistoric Caribbean be fully identified.

Despite the architectural transformation that occurred at Tibes, there is little indication of significant changes in animal use through time. There is minimal culinary change suggested by the addition of the guinea pig. Additionally, there are no significant indications of food intensification (*e.g.*, no greater quantities of smaller sized fish through time) or expanded habitat exploitation. There is some evidence that animal use during the Ostionoid period included animals or animal products for ceremonial use. One bone tube (unidentified taxa, presumably mammalian) is present that may have been used for ritual inhalation of hallucinogenic cohoba snuff (Newsom, 2010). One fighting conch shell contains red pigment that may indicate decorative or ceremonial use and there are at least two shell bead preforms. The functions of a small sample of other worked bone objects has not been distinguished as either quotidian (*i.e.* utilitarian) or ceremonial (Antonio Curet, personal communication). There are no burials or offerings of animals at Tibes. Other than guinea pigs and non-indigenous rodents, there are no remains of exotic animals. There are no animals in the Ostionoid period that are large meat packages such as sea turtle, marine mammals, iguanas, or very large fish. Interestingly, both sea turtle and marine mammal remains are present in the earlier Saladoid contexts, but not in the later deposits. There is no indication of food storage or of food waste that might be associated with high status consumption patterns. For the Ostionoid period, there is one context that appears to be a cooking area based on the quantity of burned shell (primarily arks) and rock; however, no other areas of food preparation have been identified.

One interesting phenomenon is the sheer quantity of marine shell at the site indicating that shellfish were not shucked at the shoreline 8 km away and then brought to the site as meat only. However, shellfish volume is also great for the Saladoid period; therefore, shellfish do not appear to have been a tribute food transported in quantity as a demonstration of submission, gift giving, or duty by the people who participated in social activities at Tibes during the later period. The excavation of sites near Tibes at comparable inland locations might provide indications of shellfish presence or absence that could be used to evaluate whether the quantity of shellfish at Tibes is unique.

Why is there so little indication of changing use of animals in association with the apparent political and social developments at Tibes? It is evident that labor was mobilized for construction of the ball courts and plazas, yet there is no indication the laborers were feted by those directing these projects. Nor is there evidence that those directing these projects or public ceremonies had access to different, better, or more exotic food animals. If the people engaged in labor projects or those who assembled at Tibes for public ceremonies consumed food during these events, it was apparently more of an equal potluck than a hierarchically distinguished food event. Although there is greater taxonomic richness in the Ostionoid period, the fauna appears to be evenly distributed across the site.

As Curet (1996) and Siegel (1999) have argued early political inequality and the acquisition of power by individuals who could mediate with the supernatural world may have been relatively subtle in order for individuals to build a base of support. In the case of Tibes, motivation to assist in labor projects apparently preceded material manifestations of inequality such as pottery, decorative artifacts, and restricted use of religious paraphernalia as well as animal use. I posit that the fragile nature of emerging inequality during the early Ostionoid period did not foster differential use of animals. It is not until late in prehistory (or at least later in the Ostionoid period) when the role of chief is more fully developed that food, tribute, and ritual uses of animals develop such as some of the status differences in animal use that are documented at the chiefly village of En Bas Saline (Deagan 2004). Other symbols of hierarchy may have been present during this period at Tibes, but discernable status uses of animals are minimal. With the exception of one imported small mammal (guinea pig) there are no unique animals of probable high status.

It is difficult to determine what benefits villagers received as more institutionalized power developed. Perhaps, public ceremonies that were directed by charismatic individuals promoted group unity and communal behavior without obvious distinction. The apparent relatively equal access to and consumption of similar food animals in the tropical island setting may have fostered the political developments to come. If people perceived some benefit from the increased public activity in the early stages, then elites in due course could usurp specific faunal resources for their own use without great dissension, eventually resulting in the tributary system documented at European contact.

Conclusions

The development of complex society and the use of animals in the Caribbean differ in form and content from many other geographic regions including other island regions. The islands were very rich in marine fauna along with some terrestrial birds, small mammal, and reptiles. Ceramic-age island immigrants brought plant and animal resources with them as they migrated through the islands. They established large village settlements, engaged in various social processes, and through time ranked societies emerged. The chiefdom level societies observed at Spanish contact are derived from the early and intermediate ceramic age social groups. The site of Tibes on the south coast of Puerto Rico is a complex village with deposits dating from roughly AD 400 to 1200 spanning the early (Saladoid) and later ceramic age (Ostionoid) periods. Sometime after AD 900 the site underwent a major physical and social rearrangement during which people constructed several ceremonial plazas and ball courts. I examined faunal remains from Tibes to identify status differences in animal use through time and in relation to the development of these architectural and social changes.

The Tibes faunal remains indicate that the well established pattern of animal use that developed early in the site history continued through time with minimal status distinctions emerging in the later period. The most significant change in animal use over time was the addition of the guinea pig as a food source later in the site history. The faunal data indicate that status or elite differences in the use of animals for food, ritual, and tribute were not a well-developed feature of life at Tibes. There was relatively equal use of animals by all members of the society with little differentiation through time. I argue that while labor apparently was organized and controlled by some individuals in emerging positions of power as suggested by the site architecture, these emerging elites or persons of power did not use food animals as a means of social distinction. Similarity in consumption patterns at Tibes may indicate that the nature of political inequality during the earliest period of ranking was fragile, and therefore, group and social unity was promoted with dietary and possibly symbolic similarities in animal use. People in the early stages of hierarchical society at Tibes were not distinguished as lower status individuals by the food animals or portions of animals that they consumed.

The archaeological correlates of status or rank distinctions in faunal use are dependent on contexts that are corroborated with other indications of inequality. Within Tibes there is abundant archaeological evidence of presumably high status areas (plaza and ball court perimeters), but thus far the faunal remains are primarily from diffuse midden deposits rather than from distinct pit features or contexts that can be identified as "high-status" contexts. There are neither residences nor pit features that are clearly either "elite" or ceremonial in nature. While greater taxonomic richness over time indicates faunal use was varied, apparently everyone at Tibes had relatively equal access to the animals that people collected and brought to the site. Future excavations both at Tibes and at other nearby contemporaneous sites that lack architectural plazas and ball courts will provide comparative data that may help to clarify the relationship between emerging inequality and animal acquisition, distribution, and use.

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7. A Plebeian Perspective on Empire Economies: Faunal Remains from Tel Miqne-Ekron, Israel

Justin Lev-Tov

Excavations at the site of Tel Miqne-Ekron in Israel produced a large faunal assemblage spanning the millennium covered by excavated strata. Analysis of this assemblage by the author revealed distinct changes over time in the orientation and emphases of the city's animal economy. The argument is put forward here that changes in relative frequencies of domestic species, the ratios between them and pathological evidence documented on cattle bones should be linked to changing political and concomitant economic conditions in the region during this span of time. Emphasis is placed on the seventh century BC stratum of Tel Miqne-Ekron, when the city was incorporated into the Neo-Assyrian Empire, as a case study for the effects of an empire directing pastoral production. The faunal evidence demonstrates that animal bone studies can contribute substantively to wider discussions of ancient trade and the economic impact of archaic empires.

Keywords: Near East, Philistines, Iron Age II, Empires, Animal Economy

Introduction

The study of ancient economics from the material remains of past empires has relied heavily on the distribution of exotic or high value trade goods, as opposed to low value and high bulk goods such as foodstuffs. This raises the question as to whether it is possible, or even desirable, to discuss ancient economics from the perspective of what might be termed the many, the broken and the ugly, namely food remains, as opposed to the few, the well-preserved and the beautiful, in other words metals, ivories and other craftsman-produced objects. In this paper I explore the feasibility of gaining a plebian perspective on past economic systems via the study of trade in bulk organic goods, in this case animals and animal products, via a large sample of animal bones from a *ca.* 14th through 7th century BC site in Israel.

D'Altroy and Earle (1985) characterized ancient trade in terms of two categories, 'wealth finance' and 'staple finance'. It is items that belong to the wealth finance category, meaning expensive goods of low bulk such as jewels, precious metals, and other such materials, which have dominated archaeological discourse on ancient trade. The presence of such items can be an important clue to ancient economies, since these are precisely the type of goods to have circulated among the elites of the ancient world, used to bolster their political legitimacy and maintain the social order (Baines and Yoffee 1998). Yet these high value/low bulk goods do not form the entire, nor necessarily most important, evidence of ancient economic systems. As well as prestige goods, ancient empires encouraged and directed exchange in high bulk/low value products. Where wealth finance maintained the ideological order of the empire, staple finance provided for the food and clothing-related needs of the empire. Goods of low value but high bulk like foodstuffs, livestock, or textiles have only rarely been discussed in discourse on economic relations within and between ancient empires (but see Weiss and Kislev 2004).

Although some have questioned whether long distance trade in low value/high bulk goods existed in the ancient world (*e.g.* Adams 1979), it is now becoming more and more clear that regular trade in livestock, produce, and textiles did occur (Postgate 1992, 254). Despite this trend, it is still rare to find essays which place exchange of agricultural goods into a systemic trade context. In part the bias against such studies of staple goods is due to the larger orientation of trade studies in archaeology, and especially in the Near East, toward those items immediately recognizable as rare, exotic, and, by modern standards, inherently valuable (Dever 1995, 112). In opposition to items such as precious metals, stones, and finely made pottery, agricultural evidence most often takes the form of abundant items, of seemingly local origin, and whose artifactual remains (seeds and bones) are aesthetically unattractive and perhaps, therefore, hold little attraction for many scholars. However, as Dever (1995, 112) has noted, "a genuinely *systemic* approach to ancient trade is required. . .including . . . artifacts and ecofacts" (emphasis original). Agricultural produce, whether as food, textiles, or live animals for labor, was an important part of trade, especially for Canaan, which was nearly bereft of precious metals and minerals (Dever 1995, 112). Yet, some scholars have expressed hesitance to accept that interest in acquiring direct access to agricultural goods could have been a major factor in motivating states to conquer certain territories. Thus Ahituv (1978) dismissed an interest by Egypt in Canaan's agricultural resources as a reason for their apparent control of the region during the fourteenth and thirteenth centuries BC. Rather, he argued that Egyptian records note only symbolic quantities of agricultural tribute received from southern Levantine cities, or else suggested that the goods were earmarked for garrisons stationed in Canaan.

In contrast to such reservations to utilize organic, agricultural remains as evidence of widespread trade, I argue that that ancient trade, taxation, tribute or even conquest was at times directed toward agricultural products. To date, analyses of other types of material culture recovered from excavations at Tel Miqne-Ekron have begun to shape a picture of the city's economic system. What discussion there has been so far of the animal bones has been limited to questions concerning the relationship between diet and the geographic origins of the city's Iron Age population (*cf.* Hesse 1986; Killebrew 2005, 219; Stager 1995, 344).

Historical Context

The site of Tel Miqne-Ekron is located on the eastern edge of the hilly region of southern Israel, the Shephelah, which divides the coastal plain in the west from the Judean Mountains to the east (Fig. 7.1). The mound itself sits on a tributary of a major seasonal stream, or wadi, and comprises a 40 acre lower tell in addition to a 10 acre upper occupational area (Fig. 7.2). Tel Miqne-Ekron was excavated as a joint project of the W.F. Albright Institute of Archaeological Research in Jerusalem, and The Hebrew University of Jerusalem over thirteen seasons, from 1981 until 1996. Excavations there uncovered a stratigraphic sequence spanning the fifteenth century BC (the Late Bronze Age) to the seventh century BC (the Iron Age II) (Table 7.1). Perhaps most importantly, the site yielded a seven-line inscription stating the ancient name of the city, Ekron, a previously unknown deity (possibly of Aegean origin; *cf.* Naveh 1998) and the names of kings of Ekron known from the Assyrian Royal Annals. These names are a basic key for establishing an absolute chronology for the end of the Iron Age II in the Levant (Gitin *et al.* 1997).

Stratum	Archaeological Period	Date (Centuries BC)
IX	Late Bronze Age I	15th–14th
VIII	Late Bronze Age II	14th–13th
VII	Iron Age I	First third 12th
VI	Iron Age I	Last two-thirds 12th
V	Iron Age I	First half 11th
IV	Iron Age I/II	11th–10th
III/II	Iron Age II	9th–8th
Ic/Ib	Iron Age II	7th

Table 7.1. Stratigraphy of Tel Miqne-Ekron.

Historical and archaeological analyses of Ekron and the Levant both suggest that the site forms an appropriate area for the issues to be discussed here. During the Late Bronze Age, Canaan was ruled by New Kingdom Egypt. Tel Miqne-Ekron, in that period only a small town occupying the tell's ten-acre acropolis (Gittlen 1992), seems to have been affected by the Egyptian presence nonetheless, given the relatively large number of Egyptian and other foreign material culture items found in those strata (Dothan and Gitin 1993, 1052). The reason for the Egyptian imports may be that it was a "baronial estate" (Gittlen 1992, 52, note 12), perhaps of a noble from Egypt in the empire's service. Generally, the Late Bronze Age in the Eastern Mediterranean region was a cosmopolitan era of empires and mercantilist coastal city-states conducting international trade, from the Aegean to the west to Mesopotamia in the east (Merrillees 1986, 48–50).

Conditions in the region changed during the succeeding period, the Iron Age I, around 1200 BC, when the disintegration of the Late Bronze Age world system of powerful empires led to a period of isolationism and decrease in international trade. The Philistines, and possibly other groups of people, may have migrated to the southern Levant from the Aegean region or Cyprus during this period of political collapse. The earliest Philistine city established on Tel Miqne covered not only the small Late Bronze Age settlement, but also the remaining 40 acres of the tell, which had been abandoned since the demise of the large Middle Bronze Age (*ca.* 2000–1550 BC) city there (Dothan 1998, 150–152). Ekron by the beginning of the Iron Age I was a large, well-planned, and powerful city-state, at least loosely allied with the other major Philistine city-states of the southern coastal plain in what are today Israel and Gaza (Singer 1994). Importantly, however, Ekron and the other Philistine city-states were not a part of any empire, but rather were organized as independent polities not subject to tribute burdens from imperial states (Shai 2006).

Approximately two hundred years later, beginning in the tenth century (the Iron Age II), territorial states arose where had existed chiefdoms, city-states or other types of polities. During the early part of the Iron Age II the United Monarchy of Israel, ruled by Kings David and Solomon, briefly became the southern Levant's chief power, subduing Ekron and other Philistine cities as well as territorial states in modern-day Jordan. Other powers succeeded the Israelites in controlling the Philistine city-states. In quick succession Ekron was enveloped into a succession of smaller states and large empires, including Egypt and Judah.

The Iron Age II occupation of Ekron varied over time. During the first several centuries of that period, the city was again much smaller than it had been during the Iron Age I, with settlement once more limited to the small acropolis. The shifting regional powers of the earlier centuries of

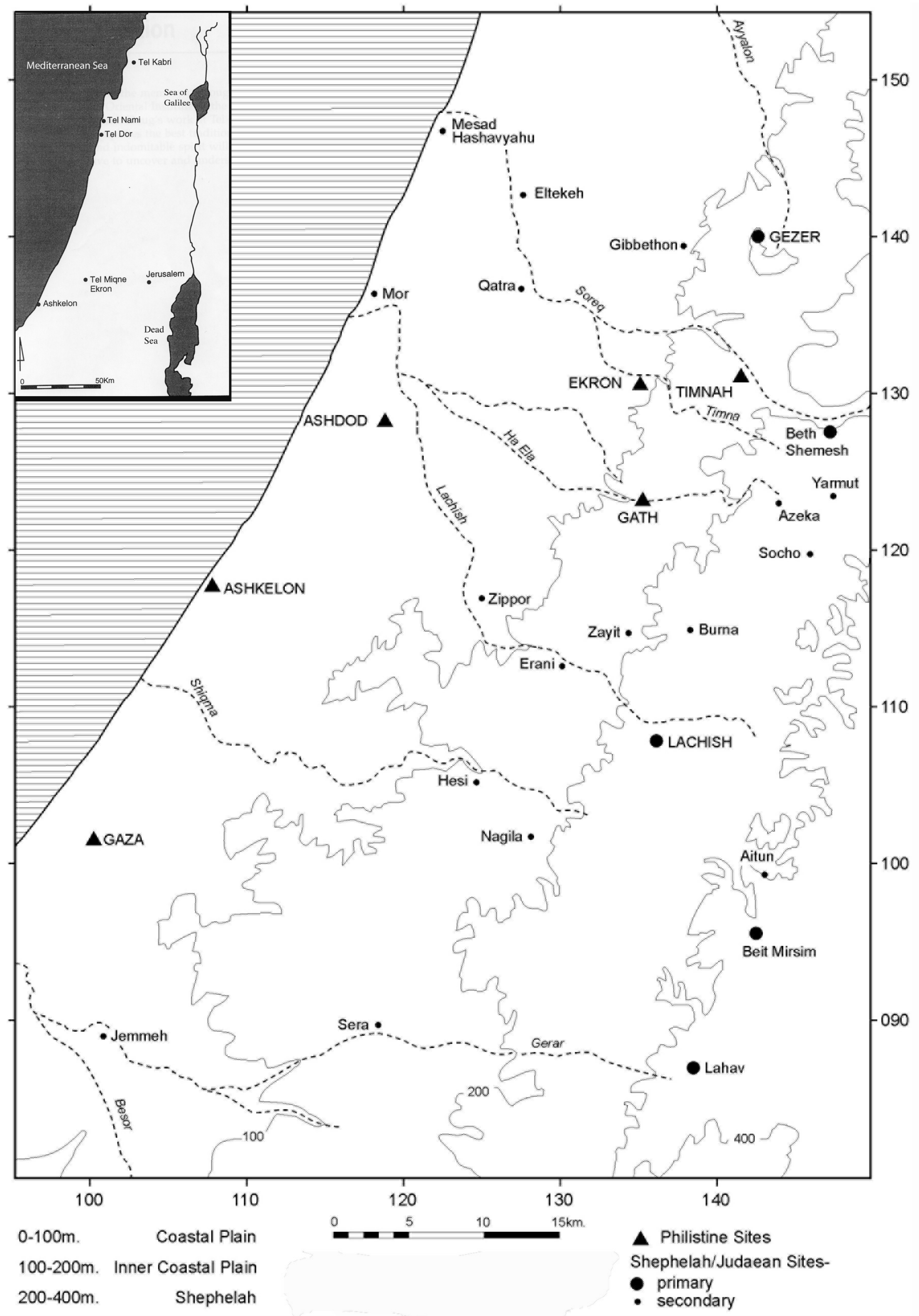


Figure 7.1. Location of Tel Miqne-Ekron on the border between the Shephelah and the southern coastal plain of Israel, with neighboring major sites.

the Iron Age II were totally subdued and replaced by the expansionist Neo-Assyrian Empire by the mid-eighth century. After a military campaign in the year 734 BC, the Assyrians conquered Ekron as well as neighbouring cities and territorial states. By shortly after 701 BC, the Assyrians had gained control over the entire Levant and re-organized its vassal Ekron in such as way as to revitalize it, making it into an important economic centre (Gitin 2004, 62). After

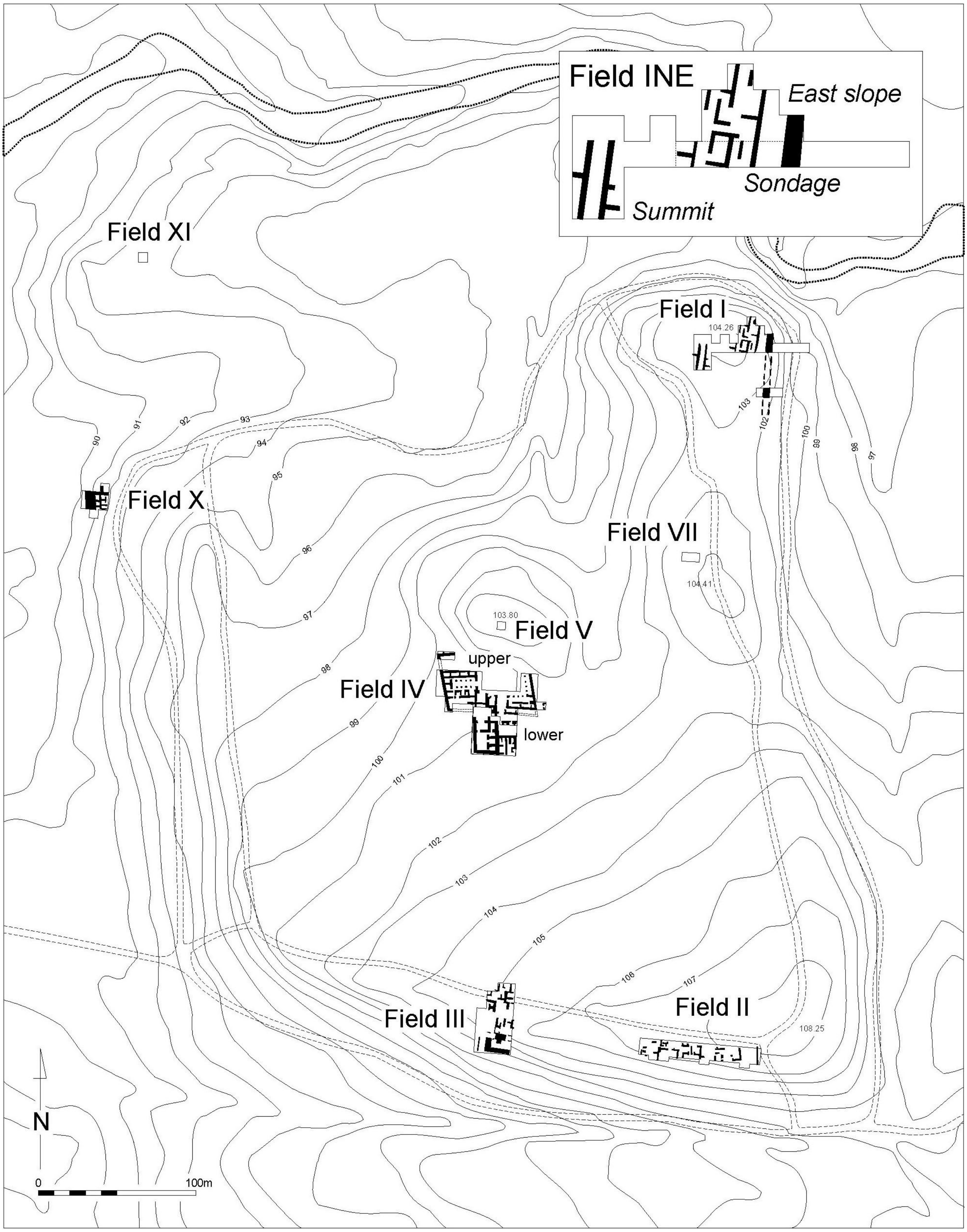


Figure 7.2. Top plan of Tel Miqne-Ekron, showing excavated areas. Note inset plan of Field I.

Ekron became an Assyrian vassal, the city expanded to re-occupy the entire top of the mound as well as slopes surrounding it, a total of 85 acres.

The reason for Ekron's reinvigoration under Assyrian control was apparently the empire's policy of turning favoured vassal states into centres specializing in the production of desired items for the empire's markets. Stager (1995, 95; 1996) and Master (2003) for instance argue that the coastal Philistine city of Ashkelon developed into a wine production and export centre during this period, while Gitin (*e.g.* 1998) has written extensively about how Ekron became an olive oil producing juggernaut during the period of Assyrian hegemony. Ekron's seventh century stratum boasts 115 olive oil presses, more than four times the number discovered at slightly earlier neighbouring sites (Gitin 2004, 62).

Relying generally on Frank's (1993) outline of economic cycles in the ancient Mediterranean world as a model, it is possible to characterize the agricultural economies of the Late Bronze Age, Iron Age I, and Iron Age II as alternating periods of intensive international trade and tribute, and periods of local trade and subsistence agriculture. The Late Bronze Age and Iron Age II were generally periods of high trade volume and more centralized political entities (Finkelstein 1995; Frank 1993). The Iron Age I, however, was a period during which international trade ebbed. During the Iron Age II, territorial states emerged and grew, rivalling one another for control over cities and regions. Later in that period, after the Neo-Assyrian Empire's conquest of the southern Levant, the last part of the Iron Age II entered another 'A' phase, encouraged by that empire's economic policies.

Clues to Ancient Economic Systems

This paper focuses on the faunal remains from the late Iron Age II, 7th century, period at Ekron as a demonstration of the high bulk/low value approach to analyzing ancient trade. The Iron Age II is the best period to illustrate such an approach, due to internationalist economic policies of regional powers and supra-regional empires. Unlike in the Late Bronze Age, Ekron was at this time firmly incorporated into the international trade and tribute systems that developed in the seventh century. Despite the focus of this paper being on the latest stratum present at Ekron, it is nonetheless necessary to present overviews of the preceding strata in terms of their faunal composition. The analysis of the Late Bronze Age and the Iron Age I components of the bone assemblage sets the stage for the longer discussion of the Iron Age II/seventh century subsample which follows, since it is through contrast with succeeding dietary regimes at the site that the economic patterning at the centre of this paper emerges.

The faunal assemblage from Ekron discussed here is large, comprising more than 12,000 identifiable and 20,000 unidentifiable pieces of bone. Recovery of animal bones during excavation was done primarily by hand, as is common practice in the region, although one in ten, or for special contexts one in five or even all, buckets of dirt were sieved through approximately 5 mm mesh screens. Recovery methods have likely truncated the diversity of species identified in the assemblage, although this may not have affected the relative abundance of the main food species, cattle, sheep, goats and pigs.

Excavation Field I at the site (see inset map in Fig. 7.2) produced the bone sample discussed here and comprised the author's dissertation (Lev-Tov 2000). Field I, located on the site's acropolis, excavation revealed a deep occupational sequence spanning the Late Bronze Age II (*ca.* 1500–1200 BC), the Iron Age I (*ca.* 1200–1000 BC), and continuing through much of the Iron Age II period (*ca.* 1000–586 BC), until the city's final destruction by the Neo-Babylonian army under King Nebuchadnezzar in 604 BC (Gitin 2004, 72). A recent dissertation on seventh century BC faunal remains from three other excavation areas in the city, Fields II, III and IV, (Maher 2004) demonstrated very similar patterning to that observed in the contemporary stratum of Field I, as does Hesse's (1986) pioneering work on a smaller sample from the site. This indicates that there was a city-wide agricultural program in existence, rather than patterning attributable merely to sampling error or the habits of one particular class of the city's residents.

The Late Bronze and Early Iron Age Animal Economies of Ekron

The Late Bronze portion of the faunal assemblage is typically Near Eastern in its species composition (Table 7.2). Within the principle Late Bronze Age stratum VIII, sheep and goats were far and away the most important animals: the two species together accounted for somewhat more than half of all identifiable bones. Aside from a small sample from an earlier Late Bronze Age stratum at the site, stratum IX, the two species were present in a 1:1 ratio. This has important implications for the interpretation of the city's animal economy. Economies which rely more

Species	Common Name	Stratum IX		Stratum VIII	
		NISP	Percent	NISP	Percent
Bos taurus	Cattle	57	24	525	27
Capra hircus	Goat	6	3	86	5
Ovis aries	Sheep	18	8	87	5
Ovis/Capra	Sheep/Goat	178	65	1199	57
Equus asinus	Donkey			3	<1
Sus scrofa	Pig	1	<1	59	3
Canis familiaris	Dog			12	1
Dama mesopotamica	Persian fallow deer	1	<1	2	<1
Gazella gazella	Mountain gazelle			1	<1
cf. *Lates niloticus*	Nile perch			18	1
	Fish, unidentified			7	<1
Totals		**261**		**1999**	

Table 7.2. Late Bronze Age species list.

Figure 7.3. Late Bronze Age sheep and goats

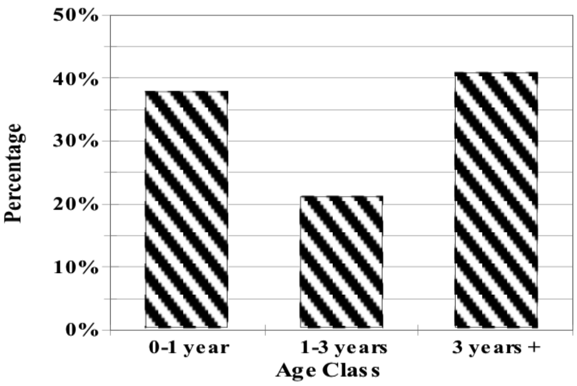


Figure 7.3a. Sheep/goat mortality patterning based on tooth wear.

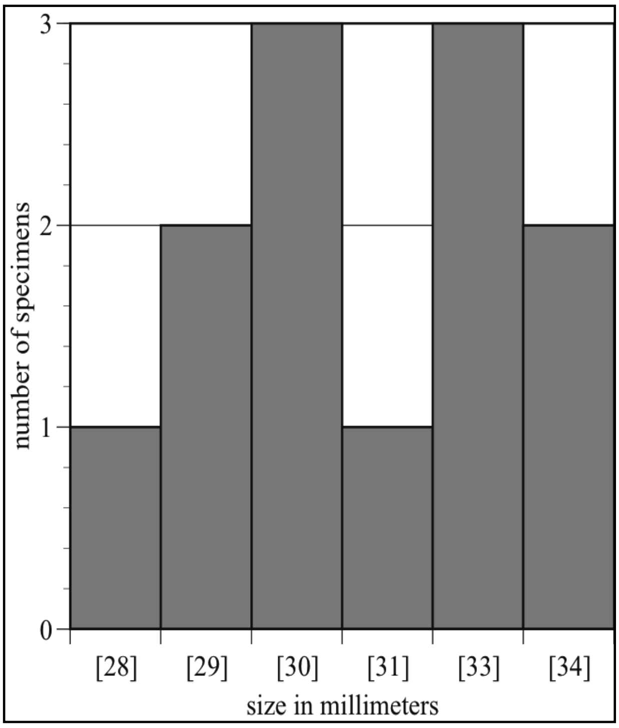


Figure 7.3b. Size of sheep based on distal humeri (Bd) and proximal radii (Bp). Mean = 31.2.

Figure 7.4. Late Bronze Age cattle

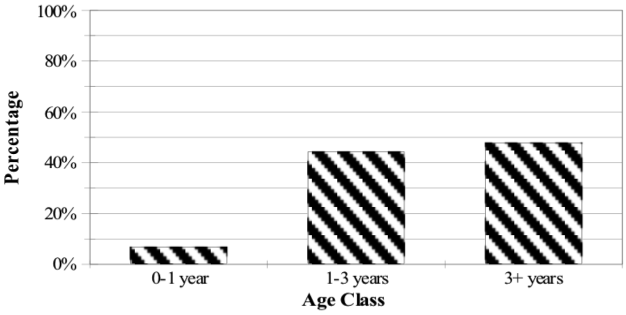


Figure 7.4a. Mortality patterning based on epiphyseal fusion

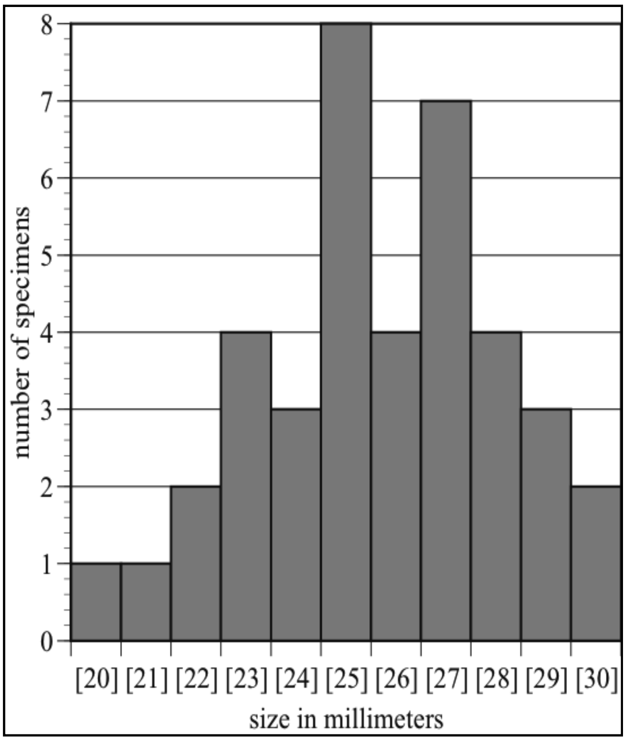


Figure 7.4b. Cattle size; phalanges 1 (Bd) and 2 (Bp). Mean = 25.6 mm.

strongly on one of the two species than the other may be characterized as specialized, such that more sheep probably means a wool focus, whereas more goats could indicate specialization on dairy products. Mortality estimates for sheep and goats, based on tooth wear patterning condensed into three age categories (Fig. 7.3a), shows an emphasis in both young and old animals, but a lesser interest on prime-aged individuals (1–3 years of age). The relative lack of prime-aged individuals may indicate that the town supported a producing economy (Wapnish and Hesse 1988), where sheep and goats were in part raised to be marketed elsewhere, possibly to support local Egyptian garrisons, as Ahituv (1978) suggested more generally. Unfortunately, the Late Bronze Age sample produced too few measurable goat bones to draw conclusions about sex ratios, while the slightly larger sheep sample tentatively suggests a preponderance of females (Fig. 7.3b). Cattle were also economically important, making up just under 30 percent of identifiable bones. Mortality data for cattle indicate, in contrast to sheep and goats, that they were slaughtered only after reaching prime age (Fig. 7.4a). If sheep and goats were traded commodities, then cattle, judging by mortality trends, apparently were not. Metric evidence compiled for cattle (Fig. 7.4b) also suggests a non-specialized emphasis, as equal numbers of specimens above and below the mean indicate even representation of bulls/oxen and cows.

Species	Common Name	Stratum							
		VII		VI		V		IV	
		NISP	Percent	NISP	Percent	NISP	Percent	NISP	Percent
Bos taurus	cattle	921	33	518	34	954	40	232	36
Capra hircus	Goat	89	3	31	2	39	2	13	2
Ovis aries	Sheep	93	3	28	2	71	3	32	5
Ovis/Capra	Sheep/Goat	1203	43	537	36	697	29	292	45
Equus asinus	Donkey	95	3	8	1	9	<1	4	1
Equus caballus	Horse	4	<1						
Sus scrofa	Pig	357	13	348	23	575	24	42	7
Canis familiaris	Dog	7	<1	4	<1	1	<1	2	<1
Dama mesopotamica	Persian fallow deer	10	<1	7	1	10	<1	4	1
Gazella gazella	Mountain gazelle	8	<1	8	1				
Hippopotamus amphibus	Hippopotamus			1	<1	1	<1		
Lepus sp.	Hare			1	<1				
Meles meles	Rock badger	1	<1					1	<1
Rodentia	Rodent	4	<1	2	<1				
Anser/Branta	Goose	1	<1						
Passeriformes	Songbird			1	<1				
Phasianidae	Pheasant			1	<1	4	<1		
Testudinata	Tortoise	2	<1			2	<1		
Ranidae	Frog/Toad			1	<1				
cf. *Lates niloticus*	Nile perch	17	<1	6	<1	10	<1	16	2
	Fish, unidentified	11	<1	4	<1	4	<1	5	1
	Crab	1	<1						
Totals		**2831**		**1506**		**2377**		**643**	

Table 7.3. Iron Age I species list.

The only other species represented by more than a few bones – three percent of the stratum VIII assemblage – was the pig. Pigs are commonly identified in small numbers, more rarely in large numbers, on most Near Eastern post-Neolithic sites. The role of pigs in the diet of southern Levantine populations may have important implications regarding the geographic origins and settlement areas of historically documented ethnic groups, with pig bone absences indicating Israelite settlements (*cf.* Finkelstein 1997). On the other hand, the appearance of hundreds of pig bones on Philistine sites has led many archaeologists to conjecture that such a diet is a reflection of their ethnicity (*cf.* Dothan 1997, 100; Stager 1995, 344), since high pork consumption has a long history in the Aegean region (*cf.* Trantalidou 1990).

Beyond possibly serving as ethnic markers in the region, pig remains may in addition or alternatively be economic weathervanes for understanding the extent of cities' involvement in international trade (*cf.* Zeder 1996, 1998). Zeder (1998), basing her ideas partly on Diener and Robkin's (1978) exploration of the reasons behind the Islamic pig prohibition, argues that during times of high regional economic integration, such as Frank's (1993) 'A' periods, raising pigs on a large-scale basis would have been discouraged by core polities. Pigs may have been disfavored because the animal produces only meat, cannot be driven to market over long distances in Near Eastern climates, and is therefore useful for only local markets rather than appealing to the widespread communities controlled by or available to a large centralized power. In other words, there may have been little to no profit in pork futures even by the standards of the palace-run economies of the second and first millennia BC.

The hypothesis that, in the Middle East, pig-raising has historically been connected to integration or lack of integration into regional powers and empires necessitates a diachronic approach. For the hypothesis to hold at Ekron, there must be evidence for pig-raising in some periods but not in others. What is interesting at Ekron (and in at least two neighboring sites, Timnah and Ashkelon; *cf.* Hesse 1990, 216), is that there exists a dramatic rise in the importance of pigs from the last Late Bronze Age stratum (stratum VIII), to the earliest Iron Age I levels (stratum VII), a shift from three to thirteen percent. This dietary change is coincident both with the possible migration of the Philistines to Canaan, and with the end of the Late Bronze Age 'A' cycle and the beginning of the Iron Age I 'B' phase (Frank 1993). Taking up the economic hypothesis to explain the change, it may be that the collapse of Egyptian control and concomitant tribute demands freed Ekron and other cities to develop their economies so as to favor locally marketable products instead of having to supply foreign markets.

Other zooarchaeological evidence, including the general range of species and their relative abundance, suggests a localized animal economy at Ekron during the Iron Age I (Table 7.3). Cattle increased in importance during the Iron Age I, and mortality data based on epiphyseal fusion suggests that a majority of animals, 60 percent, lived until at least three years; only a very small proportion of the herds were slaughtered within their first year of life (Fig. 7.5a). The Iron Age I faunal profile shows an emphasis on cattle along with pigs. Interestingly, this is not a dietary emphasis commonly replicated in the western Aegean, save in the far north of Greece and at Tiryns (*cf.* von den Driesch and Boessneck 1990, 93; Trantalidou 1990, 398). The increased

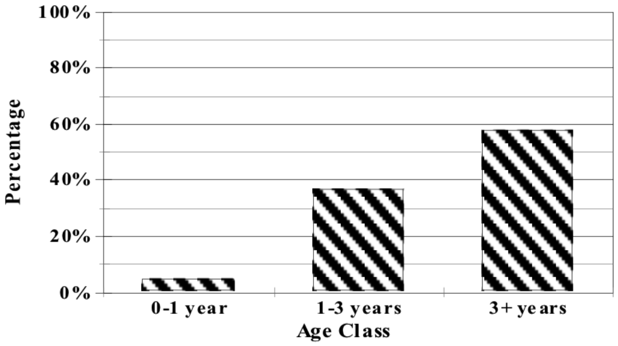


Figure 7.5a. Iron Age cattle mortality patterning based on epiphyseal fusion.

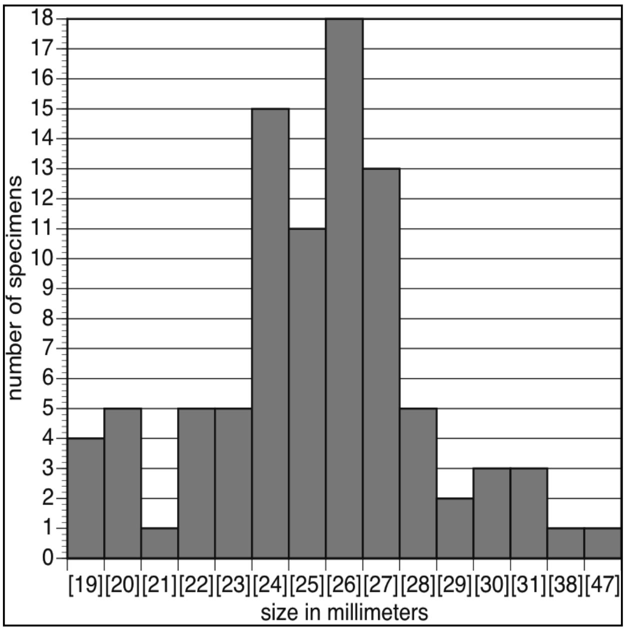


Figure 7.5b. Iron Age I cattle. Size; phalanges 1 (Bd) and 2 (Bp). Mean = 25.6.

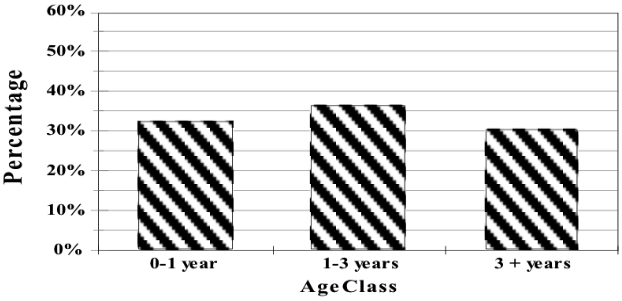


Figure 7.6a. Iron Age I cattle mortality patterning based on tooth wear.

utilization of cattle may instead be economic, rather than ethnic, in nature. The settlement's expanded population, indicated by the newly enlarged city of the era, may have needed more cattle for their use in traction. In fact, pooled metric measurements of the distal first phalanx (Bd) and proximal second phalanx (Bp) (*cf.* Davis 1996; von den Driesch 1976) demonstrate the presence of a relatively large number of males, presumably those specimens greater than the mean (Fig. 7.5b).

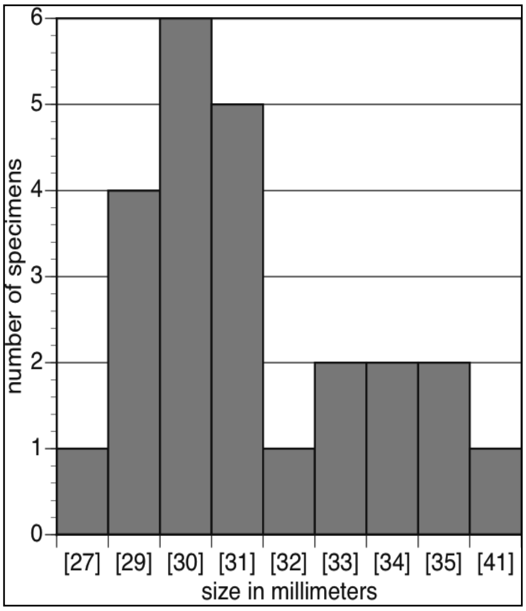


Figure 7.6b. Iron Age I sheep and goats. Size of goats; distal humeri (Bd) and proximal radii (Bp). Mean = 31.6 mm.

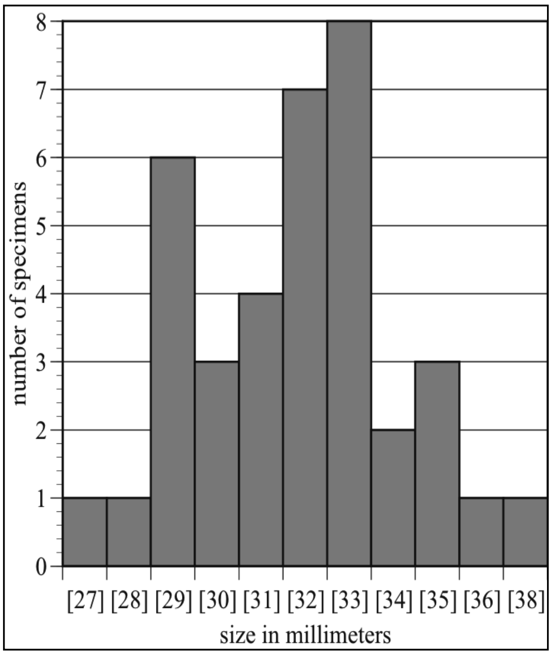


Figure 7.6c. Iron Age I sheep and goats. Size of Iron Age I sheep; distal humeri (Bd) and proximal radii (Bp). Mean = 31.8.

Sheep and goat management during the early Iron Age was different from the preceding Late Bronze Age. At this point in time, the city's population managed the animals seemingly with the goals of both meat and wool production, as sheep outnumbered goats by about 1.6:1. Mortality evidence from tooth wear suggests that there was no highly-focused culling pattern; there is an emphasis on young adults one to three years old, but also quite a number of younger and older animals were slaughtered (Fig. 7.6a). Metric data underline that idea: goat distal

Species	Common Name	Stratum			
		III/II		Ic/Ib	
		NISP	Percent	NISP	Percent
Bos taurus	Cattle	346	21	271	25
Capra hircus	Goat	50	3	37	3
Ovis aries	Sheep	79	5	83	8
Ovis/Capra	Sheep/goat	1063	63	616	56
Equus asinus	Donkey	10	1	10	1
Sus scrofa	Pig	80	5	19	2
Canidae	Dogs/Foxes	3	<1	2	<1
Dama mesopotamica	Persian fallow deer	1	<1	5	1
Gazella gazella	Mountain gazelle	2	<1	1	<1
Hystrix sp.	Hedgehog			1	<1
Passeriformes	Songbirds	2	<1	1	<1
Phasianidae	Pheasant			6	1
cf. *Lates niloticus*	Nile perch	38	<1	42	4
	fish	14	2	13	1
	crab	1	<1		
Total		**1689**		**1107**	

Table 7.4. Iron Age II Species List.

humeri and proximal radii demonstrated that two-thirds of the sample was likely female (Fig. 7.6b), presumably reflecting an emphasis on dairying. On the other hand, the same elements from the sheep sample showed a bias toward male animals, perhaps kept for wool (Fig. 7.6c).

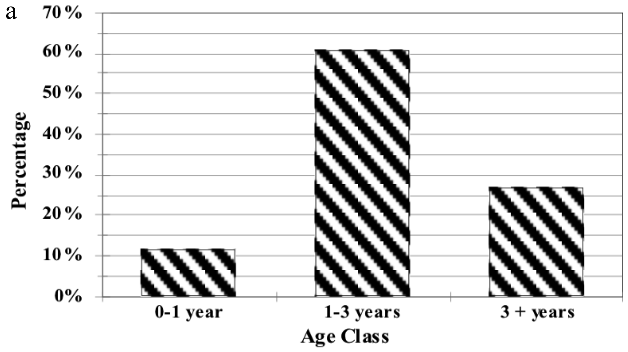
First Millennium World System

The forgoing summary of Ekron's animal economy in the Late Bronze and early Iron Ages sets up the main thrust of this paper, namely the meaning of patterning visible in the city's animal agriculture system during the Iron Age II. At Ekron, the Iron Age II begins with stratum IV, dated to the late eleventh and early tenth centuries, thus forming a transitional late Iron Age I/early Iron Age II layer. At the time of stratum IV's formation, the Philistine population in general and the city of Ekron in specific was undergoing a number of political, cultural and economic changes, possibly all related to one another. Assyrian records, Egyptian military campaign boasts and the Old Testament record the re-encroachment of successive regional powers and empires on the southern Levant. As a result of such political/military changes, the Philistines lost their independence and military supremacy, and began to absorb more foreign influences than previously (Gitin 1995, 74). Yet some type of distinctive group identity was apparently maintained until after their defeat by the Neo-Babylonian empire in *ca.* 604 BC and their subsequent deportation to southern Mesopotamia (Gitin 1998, 180).

Along with the Philistine's adoption of foreign material culture traditions and loss of independence, the city of Ekron underwent significant physical changes after *ca.* 1,000 BC. The Iron Age I 40 acre city shrank once again to cover only the ten acre acropolis, and did not re-expand until some 250 years later. In the late Iron Age II, at the start of the seventh century BC, Ekron became a vassal state of the Neo-Assyrian Empire. The Assyrians' economic policies seem to have singled out certain cities for exclusive production of prized commodities. A strong case has been made that Ekron, which fluoresced after the Assyrian conquest to a size of *ca.* 85 acres, was transformed into the major olive oil producing center for the entire region (Gitin 1998). Much of the oil was likely transported to Egypt, where Levantine olive oil was in great demand (Faust and Weiss 2005).

The dietary changes which are observable in the Iron Age II strata begin suddenly in stratum IV. That stratum presents a different dietary picture from the forgoing three Iron Age I layers, in that the relative frequency of pig remains drops sharply, from 24 percent in stratum V, to just seven percent in the following layer (Table 7.3). Stratum IV in this area of the site is, however, an ephemeral layer, with few clearly dated contexts and therefore a small sample of animal bones. Nonetheless, the later-dating strata III and II, which are better preserved, also demonstrate the pattern of a severe decline in pig bone percentages. To what can we attribute the drop in pig popularity, a phenomenon which continues for the remaining 400 years of the city's occupation? Within the same stratum that pigs begin a precipitous decline, several trends emerge in the animal remains, all of which last and even intensify for the remainder of the city's occupation.

Aside from the pig trend, another new pattern is the relative importance of sheep to goats (Table 7.4). During the seventh century, stratum Ic/Ib, the ratio of sheep to goats changed more dramatically than previously, now favoring sheep by 3:1, similar to the ratio published for contemporary levels at the nearby site of Tel Jemmeh (Wapnish 1981, 116). In addition, some 600 loomweights were found in stratum Ic/Ib, in the same buildings that housed the olive presses (Gitin 1997, 87–100). This underscores the shift undertaken by Ekron's population, from a generalized herding economy, to one which specialized on certain agricultural products. Mortality data for sheep and goats may also be indicative of an emphasis on secondary products, since relatively few animals were slaughtered before reaching one year of age (Fig. 7.7a). There is instead a focus on prime-aged animals. Metric data show that a slight majority of specimens were likely from male sheep (52 percent; Fig. 7.7b) and goats (58 percent; Fig. 7.7c) based on the sample of first and second phalanges.



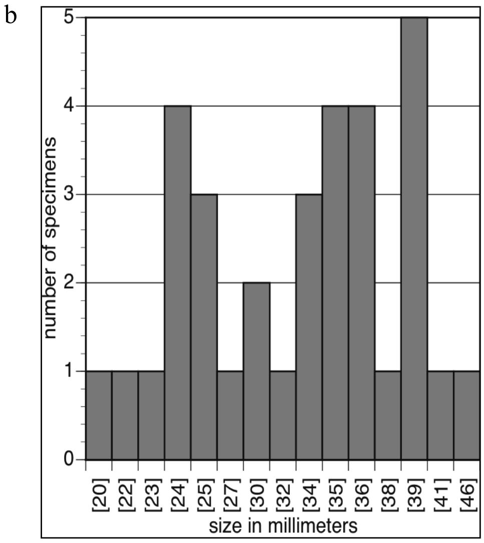
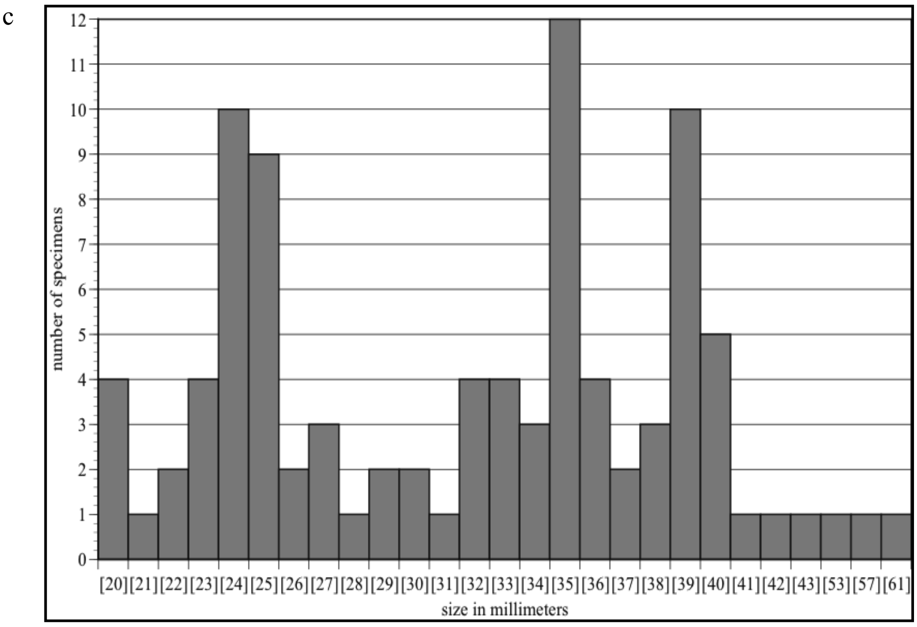


Figure 7.7. Iron Age II sheep and goats. a. (above) Sheep/goat mortality patterning based on tooth wear. b. (right) Size of sheep; phalanges 1 (Bd) and 2 (Bp). Mean = 32. c. (below) Size of Iron Age II goats; phalanges 1 (Bd) and 2 (Bp). Mean = 32.



Other indications from the animal bone sample also point to economic change and, even more intriguingly, independent suggestions that the change was in the form of greatly increased trade. Pathological evidence derived from studying the approximately 200 cattle phalanges contained in the assemblage demonstrates a wide range of disease variation, from absent or mild, to moderate, to severe (Fig. 7.8). Detailed recording of 'pathological index scores', that is, the degree of osteoarthritic degeneration, which Bartosiewicz *et al.* (1997) argue relates to the use of cattle for traction, show a statistically significant increase in the intensity/frequency of disease as compared to earlier periods (Table 7.5). The very high degree of osteoarthritis present in the Iron Age II samples suggests intensified exploitation of cattle, perhaps to plow more fields for larger crops, or to haul goods to the markets to which the Philistines had become connected. Fusion-derived mortality data for cattle (Fig. 7.9a) indicates an emphasis on prime-aged and older animals, suggestive of cattle kept for dairying or traction. The metric evidence is, however, more equivocal (Fig. 7.9b); although in an economy emphasizing traction a predominance of males would be expected, in this case there is an even number of males and females.

Period	Average	Mode	Range
Iron Age II	4.0	3.7	0-9.7
Iron Age I	3.9	3.7	0-8.7
Late Bronze Age	3.1	2.7	0-5.7

*Two sample t-tests run on the paired samples, Late Bronze Age vs. Iron Age I, and Iron Age I vs. Iron Age II, demonstrate that statistically significant differences exist between the datasets ($p<.05$).

Table 7.5. Pathological index scores of cattle phalanges.

The shift away from swineherding toward a caprine (specifically sheep) -dominated animal husbandry system

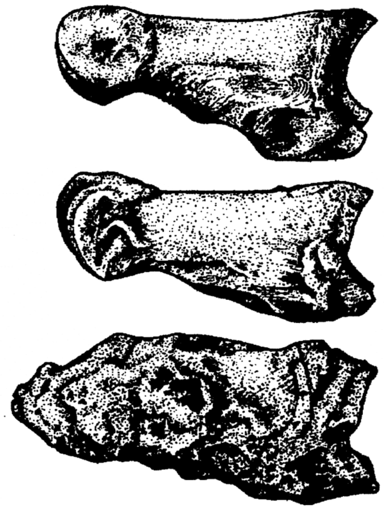


Figure 7.8. Three of the more than 200 cattle phalanges, which vary in amount of osteoarthritis present: absent (top); moderate (center); severe (bottom).

was emblematic of larger economic processes which Ekron and other city-states of the era were undergoing at the beginning of the first millennium BC. Ekron and other cities were reduced to vassals in the hands of new territorial states, which may have had consequences for their economies. Rather than supplying itself and its hinterland with agricultural products, Ekron's population now may have been forced to produce surplus quantitites of goods suitable for trade with and tribute to the various states which ruled them. The variety of foreign material culture items which appear in increasing proportions during the tenth, ninth and eighth centuries, symbolize the city's new trade relationships. If one of Ekron's main products was wool, it may have been sent to Phoenicia in exchange for the range of Phoenician imports identified there (*cf.* Gitin 2004, 60–61). The Phoenician habit of importing wool is hinted at in the Old Testament, in Ezekiel's (XXVII:18, 21, 24) lamentation over the city of Tyre, as when the prophet extols its former wealth and notes how Damascus, Arabia and merchants from the horn of Africa traded sheep, goats, wool, fine clothing and carpets there.

One final piece of faunal evidence comes not from the domesticated animals discussed exclusively so far, but rather from fish. The proportion of fish bones relative to all other identifiable species stayed more or less the same from the Late Bronze Age through the Iron Age I. However, in the Iron Age II strata the amount of fish bones increased dramatically. The largest amount of fish bones present, five percent, comes from the seventh century BC stratum (Fig. 7.10). Large numbers of fish bones from the Mediterranean and beyond have also been identified from contemporary deposits in Jerusalem, Lachish and beyond, indicating that widespread and well-organized trade in low value/high bulk and easily perishable products regularly took place (Faust and Weiss 2005, 75). What is especially revealing about the fish bones from Ekron is that the vast majority of them are from Nile perch. Bones of this freshwater

Figure 7.9. Iron Age II cattle

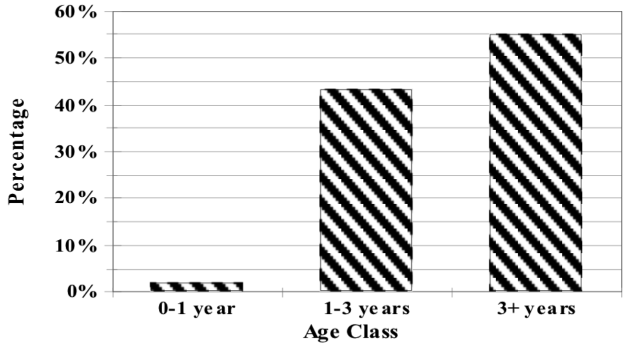


Figure 7.9a. Mortality patterning, based on epiphyseal fusion.

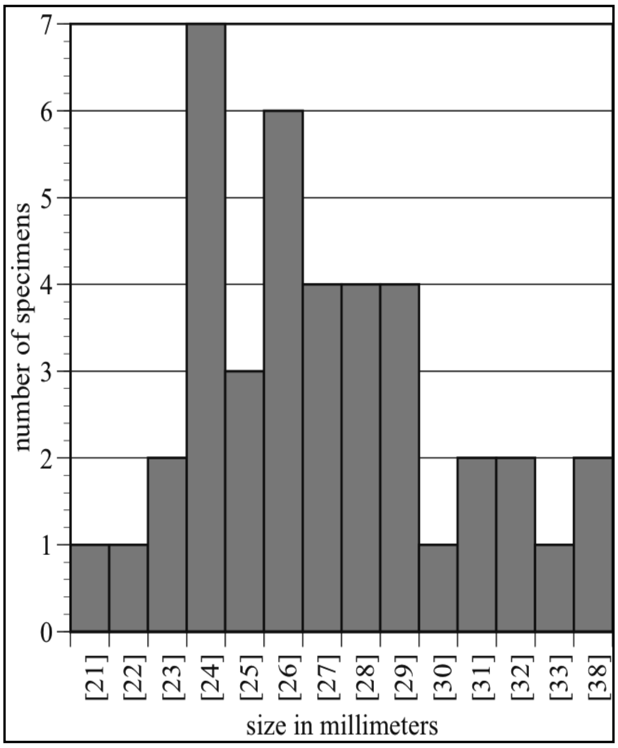


Figure 7.9b. Size; phalanges 1 (Bd) and 2 (Bp). Mean = 26.2.

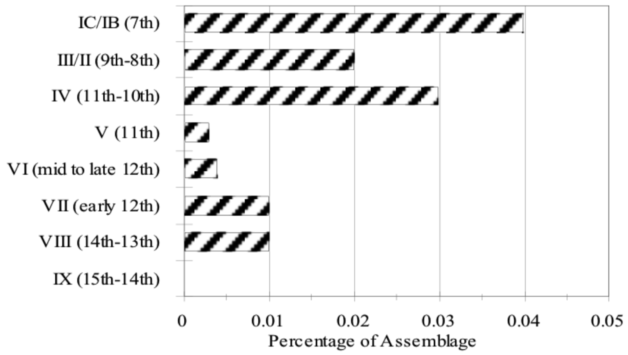


Figure 7.10. Percentage of fish among identifiable bones in each stratum.

species have turned up at many other sites in the Near East and in Cyprus. Nile perch require deep, fast-moving and well-oxygenated waters (Brewer and Friedman 1993, 74), an aquatic environment not known to have existed even in the Levant of three millennia ago, making it likely that the fish were imported from Egypt (O. Lernau 2002; and Golani 2004). The annals of seventh century Assyrian King Sargon II note that he received some type(s) of dried as part of a tribute payment from one of the Philistine cites (Elat 1978, 30; Tadmor 1966, 93). Further, an Assyrian wall relief depicts what H. Lernau (1986/1987, 234) suggests are Nile Perch being unloaded at a Phoenician city. In the same vein, an earlier Egyptian story about the misadventures of a court official named Wenamun records his attempt to buy cedar logs in Phoenicia with a variety of goods, including 30 baskets of fish from Egypt (Lichtheim 2003, 92). Demand by both Assyrians and Levantine peoples for the large Egyptian fish may have spurred trade in agricultural as well as craft products. If Ekron produced olive oil while Ashkelon produced wine, both apparently destined in part for Egypt, then perhaps Egyptian rulers sent fish, among other things, in return (Gitin 1997, 84).

Discussion

I suggest above that the changes observed in the faunal assemblage's composition and statistics, especially within the seventh century BC sample, relate to the city's incorporation into the large economic system of the Neo-Assyrian Empire. What remains to be demonstrated, however, is the role of animals, seen through faunal remains, in driving ancient empires' economies and helping imperial states accumulate wealth. Using Wallerstein's 'World-Systems Theory' as a model (*cf.* Wallerstein 1974, 15, 37–38, 63), it is possible to show how faunal remains outline key economic changes as the city became enmeshed in imperial economies during the Iron Age II.

The changes demonstrated above in herding strategies are coincident with the Philistines' loss of power and independence. States which took turns sacking and/or ruling over Philistine cities, Egypt, the United Monarchy, Judah, Assyria and once again Egypt, siphoned off tribute and taxes in the form of various goods (Weinstein 1998, 192), rather than actually colonizing the conquered lands. This form of conquest, where the indigenous and self-supporting economic system is modified to one directing goods toward a core state (Smith 1995, 9), was characteristic of both the Assyrian and Egyptian eras of occupation over the Levant (*cf.* Knapp 1992, 90–93; Smith 1995, 17).

How, then, did Ekron's economy fit into the Neo-Assyrian Empire's rubric of imperial economic administration? As in many archaic states, there seems to have been a dual economic system in place, via wealth items or staple goods. By the seventh century BC, the two types of economic systems were merging into one, since pieces of silver classified by weight were used more and more by the Assyrian Empire to facilitate exchange across the extensive lands it ruled and beyond. All forms of goods as well as payments for labor or of tribute were executable in cut pieces of silver, known technically as *Hacksilber* (Gitin and Golani 2001, 31, 36–37).

The staple finance system helps to explain not only the profiles derived from faunal remains, but also ties these patterns into changes visible in other realms of material culture from Ekron. Clearly, wealth finance was important to ancient states because of its ideological function (Baines and Yoffee 1998, 213). Trade in prestige items was largely an exchange system performed by and between elites, and so served to maintain social ties between vassal and overlord (Champion 1998, 12; Polanyi 1957, 337–338). The Assyrians, among others, gifted their vassal rulers with valuable craft objects, and *vice-versa* (Postgate 1974, 127–128; 154–155). Thus, the Assyrian annals record that Padi, king of Ekron, paid Assyrian monarch Sennacharib 30.3 kg of silver as an annual 'gift' (Postgate 1974, 21). The wealth exchange system demonstrates not only international trade in general, but the characteristic craft objects it focused on have the ability to pinpoint where goods were brought from. Thus the seventh century stratum at Ekron has produced a large number of foreign-produced craft objects, from Greek pottery, a number of *Hacksilber* hoards made up of objects produced in Phoenicia, a silver pendant depicting an Assyrian ritual scene, and a number of ivory and other items originating in Egypt and likely arriving at Ekron as Assyrian-derived plunder (Gitin 2004, 70–71, note 14; and Golani 2001).

Wealth objects such as those described above served the important ideological function of cementing the paternalistic relationship between overlords and vassals, whereby the latter were dependent on the former for their legitimacy and political survival (McGuire 1989, 49; Renfrew 1996 [1986], 126–129). But it was staple finance in the form of agricultural goods which often provided both the motive and means for imperial expansion. The reservations of Wallerstein (1974) and Adams (1979, 397) in accepting that staple trade over long distances was a major part of ancient imperial economies seem overly cautious given mounting evidence for Ekron and elsewhere (*cf.* Kohl 1987, 2–5; Wapnish 1996, 293). Assyrian records suggest that bulk goods were brought from various parts of the empire's periphery to the capital city (Postgate 1974, 122–123), or else moved from one periphery to another and the proceeds from that trade eventually sent back to the empire's heartland.

It is certainly clear from the olive oil facilities and loomweights found at Ekron that the Assyrians initiated production of staple products on a scale far beyond what could have been consumed locally. Gitin (1997, 87–90) describes the loomweights as being of a large size, suitable for producing coarse, heavy thread. Coupled with the preponderance of sheep relative to goats, it seems clear that a secondary industry existed at Ekron, namely, industrial-level textile production. From a seasonal scheduling point of view, a wool textile industry would have fitted well into the city's economy. Olive oil production encompasses the fall and winter months, when olives are harvested and pressed.

By contrast, sheep are sheared in the spring: wool can be spun and cloth woven in the subsequent summer months. Indeed, the sheep identified in the later levels of Ekron may themselves have arrived at the city as the result of trade. Both Gitin (1997, 83) and Faust and Weiss (2005) suggest that the neighbouring state of Judah may have developed a primarily agricultural economy at this time, exporting wheat as well as sheep and goats to Philistia and other neighbouring areas. Additionally, two weed species, *Arnebia decumbens* and *Erucaria microcarpa*, were identified in seventh century destruction levels at Ashkelon (Weiss and Kislev 2004, 7–8). The species are native to the Negev desert and the Judean hills to the east of Ashkelon and Ekron, such that Weiss and Kislev (2004, 7–8) suggested they could have been brought to the city caught in the wool of caprines brought from Judah to Ashkelon.

Summary and Conclusions

This study leads to several conclusions, on different scales of analysis and interpretation. First, from a strictly dietary perspective, economic and political changes that affected Philistine society as a whole also impacted the population's diet. This is visible in sudden dietary changes, both between the Late Bronze Age and the Iron Age I, and the Iron Age I and early Iron Age II. During the Late Bronze Age, the town at Tel Miqne supported a typically Levantine animal economy, with generalized sheep and goat pastoralism, and to a lesser extent cattle herding. Although Egyptian imports are present in the Late Bronze Age strata of Tel Miqne-Ekron, they are far from abundant and emanate mainly from a single human burial (Dothan and Gitin 1993, 1052). Nile Perch are also relatively rare during this period, though somewhat more frequent finds than in the subsequent Iron Age I. Although Tel Miqne-Ekron was far from being a major player within New Kingdom Egypt's Levantine empire, this settlement, from the point of view of animal bones, may have supplied tribute to Egypt or supported Levantine-based Egyptian garrisons. Certainly, the low numbers of pigs at this and other Late Bronze Age Levantine sites could be understood from the perspective of large scale swineherding being antithetical to empire economics.

In contrast to the Late Bronze Age animal economy, the Iron Age I faunal profile of Ekron suggests a more diversified agricultural program. Whether the Philistines raised pigs on a large scale during the period *ca.* 1200–1050 BC because they were not beholden to external empires, or whether they did so for reasons of ethnic preference, it is clear that it was a new and short-lived phenomenon. Yet there is little in the economic strategy to indicate that the Iron Age I population marketed their animal produce far outside the city or the quasi-state of Philistia. Other aspects of the faunal analysis show an economy unfocused on male *vs*. female animals, specialized herd culling practices, and even numbers of sheep and goats.

At the end of the Iron Age I and beginning of the Iron Age II another dietary and economic shift occurred. If political changes – the emergence of new powers which threatened and indeed did usurp the Philistine cities' independence – initiated the observed dietary shifts, then it was economic opportunities and burdens that cemented and intensified them. Therefore the present work moves the discussion of faunal remains from Philistine sites from a narrow discussion of the relationship between percentages of pig bones and ethnicity in the period *ca.* 1200–1000 BC, to an understanding of how animal bones may in fact relate to cultural phenomena beyond the scope of the dinner table.

Leaving the kitchen, it is possible, through the example of Philistine Ekron in the late Iron Age II, to see zooarchaeology as a tool which can profitably be used to reorient the study of trade toward becoming a more inclusive enterprise (*cf.* Dever 1995). In this, zooarchaeology now joins archaeobotanical studies (*cf.* Weiss and Kislev 2004) in a study of trade also encompassing staple finance. Changes over time in the faunal assemblage, most apparent in the seventh century sample, coincide with the appearance at Ekron of silver as currency, the planned olive oil/textile production areas, the city's remarkable expansion and the appearance of relatively large numbers of trade goods demonstrating Phoenician influence. Faunal remains in this context form an independent line of evidence confirming the significant economic changes widely discussed with other types of material culture.

Moreover, however, patterning in the bone sample illuminates what is only hinted at from the study of more glamorous material culture. After all, wealth items are relatively rare in the archaeological record compared to remains of staple goods, seeds and animal bones. In this case study, faunal remains provide the critical missing link in understanding how the empire-directed economy of Ekron worked during the seventh century. Thus, while Gitin and Golani (2001) have discussed the Phoenician characteristics of the silver hoards, and Gitin (1997) has noted the large number of loomweights as evidence for a weaving industry, it is the ratio of sheep to goats which demonstrates that Ekron's population doubtlessly raised sheep for their wool, and probably traded the cloth so produced to the Phoenician cities. In return, weavers may have received payment in silver or Phonecian craft goods. Further, it has until now not been certain what the Philistines received from Egypt in return for olive oil. Gitin (1997, 84) vaguely suggested that "Ashkelon prospered as a great emporium, probably exporting Philistia's oil and wine and importing fish and grain from Egypt", but lacked evidence to prove the existence of such an exchange pattern. Damaging that assumption, Weiss and Kislev (2004) have since demonstrated that wheat recovered from the excavations in Ashkelon most likely originated elsewhere in Canaan rather than Egypt. However, the abundance of Nile Perch bones in stratum Ic/Ib at Ekron provides the critical piece of evidence to document that exchange postulated by Gitin most likely did occur.

The faunal data from Tel Miqne-Ekron, viewed more abstractly, move the archaeological study of trade beyond its traditional focus on prestige goods while integrating insights from staple commodities. In outlining a new approach to the archaeological study of trade, Dever (1995, 113) argued that archaeologists should "observe not only isolated 'exotic' artefacts, but also the ecological and social context that alone could give them cultural significance". Turning this statement around, it appears that it is even possible, here demonstrated with faunal remains, to delineate the overarching economic, ecological and social contexts which are responsible for the occasional appearance of exotic artefacts. If it was trade in wealth goods which cemented loyalties and supported the social order of empire, then it was exchange of staples – even the former for the latter – which maintained the far-flung populations of empires. The animal bones of Ekron are an example showing how zooarchaeology's contribution to the archaeology of complexity can be moved from kitchen and pasture to markets and market economies.

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8. Continuity and Change in Faunal Consumption Patterns at the Pre-Inka and Inka Site of Yoroma, Bolivia

José M. Capriles, Alejandra I. Domic, and Sonia Alconini

This paper details the results of the zooarchaeological study of the faunal assemblage recovered from the site of Yoroma, Bolivia. Analyses provide information about the differential use, consumption, and discard of fauna from Classic Yampara (AD 800–1300) and Inka-Yampara (AD 1300–1536) cultural contexts. The socioeconomic changes produced during the Inka domination of the region are discussed as well as their manifestation in the archaeofaunal record.

Keywords: Camelids, Inka, mollusks, Yampara, zooarchaeology

Introduction

The expansion of the Inka Empire across the Andes produced significant changes in a number of local societies characterized by a diverse range of economic organization and political integration (D'Altroy 2002; Moseley 2001; Murra 1980; Stanish 2003). The imperial strategies enforced to extract resources and control these populations were consequently heterogeneous and variable. Zooarchaeological research has great potential for shedding light on these strategies as well as their impact on local populations and their associated economic systems (D'Altroy *et al.* 2000; Miller 2004; Sandefur 1988, 2004; Wing 1988).

In this article, we report the results of the zooarchaeological analysis of the faunal remains recovered during the 2003 excavations of Yoroma, Bolivia. This settlement was a major Yampara and Inka administrative center with well-preserved enclosures and domestic structures (Alconini 2002, 2005). The Yampara were a chiefdom-level society distributed along the warm intermediate valleys of the Cordillera Oriental which divides the Andean highlands from the Amazon and Chaco lowlands. The Yampara integrated resources from both ecological regions into their cultural inventory. On the one hand, the Yampara practiced intensive farming, especially of maize, and had a hierarchical political structure (Alconini 2004, 2008; Julien 1995). On the other hand, they were linguistically and culturally more related with eastern tropical groups, as seen for example, by their use of bows and arrows (Barragán 1994).

Yoroma is located in the confluence of the Inka Pampa and Pilcomayo rivers, immediately north of the Pucara de Oroncota, a major physiographic feature and an important prehispanic settlement system (Fig. 8.1). Synclines of sedimentary rocks dominate its irregular landscape. The climate is warm and dry with a nine-month long dry-season and occasional rains during the wet season (December–February). The vegetation is dominated by xerophytes, including fragmented patches of churqui (*Prosopis ferox*), molle (*Schinus molle*), ceibo (*Erythrina falcata*), and janchicoco (*Parajubaea torallyii*) (Navarro and Maldonado 2002). The native wild fauna includes Andean fox (*Pseudalopex culpaeus*), puma (*Puma concolor*), taruka deer (*Hippocamelus antisensis*), vizcacha (*Lagidium viscacia*), and several species of caviomorphs (Ibisch *et al.* 2004). In 2005 Oroncota was designated as a Protected Area and several studies are currently being implemented to document and preserve its rich natural and cultural resources.

The center of Yoroma had a long occupational sequence prior to the Inka domination of the region. Over time, the site witnessed the emergence of social differentiation, along with specialized craft production (Alconini 2005). During the Inka conquest, major installations were located in the vicinities of the site, including the Oroncota Complex on the Pucara de Oroncota plateau and Inkarry Moqo on the Inka Pampa valley floor. Despite the marked architectural investment patent at these sites, matched only by high-prestige buildings found in the Inka imperial core, both facilities had limited human occupation and did not

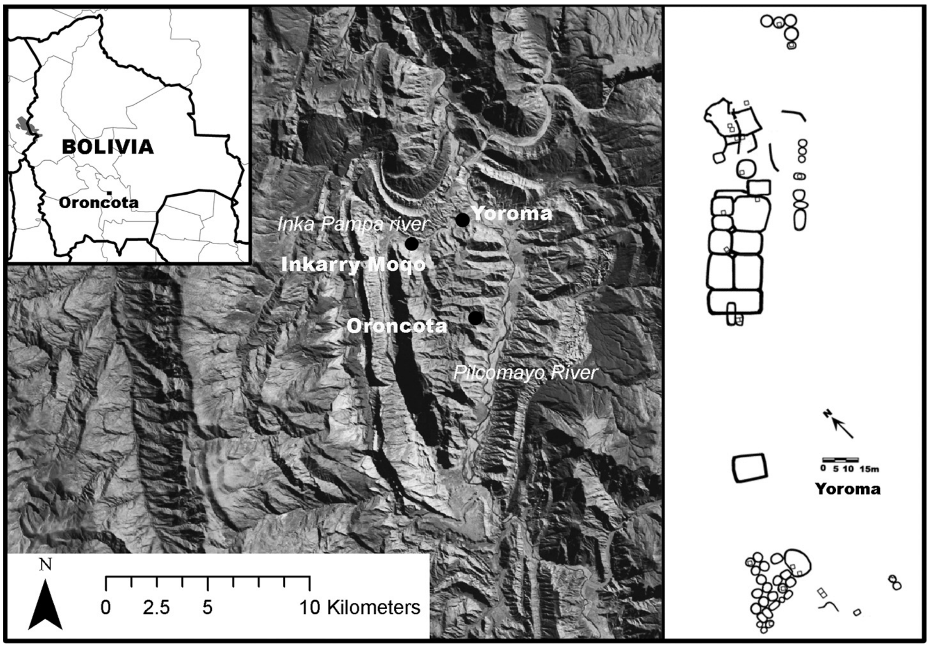

Figure 8.1. Study area and map of the 2003 excavations at Yoroma.

constitute the focus of demographic attraction. Only restricted craft production and other specialized activities such as public feasts seem to have been conducted in these imperial installations (Alconini 2002). In contrast, Yoroma during the Inka period increased in size and complexity. Quartz lithic production intensified at a communal scale and rites to the ancestors and possibly food redistribution activities were held at the site (Alconini 2005).

Similarly to other strongly hierarchical and integrated polities, the Inkas sponsored large-scale feasts as an effective mechanism to renew political alliances, preserve social cohesion, and warrant sociopolitical stability. In addition to other modifications in the use and discard patterns of faunal resources, the remains of possible public redistribution activities should be observable in the archaeofaunal record of sites such as Yoroma. Our goal is to understand the characteristics of the consumption and utilization of animal resources during the Classic Yampara and Late Yampara Inka occupations at Yoroma, and how (or even if) the Inka conquest modified pre-existing patterns of faunal use.

Materials and Methods

In 2003, fieldwork at Yoroma included mapping the site. Three sectors with well preserved architecture and surface remains were identified: east, center, and west. A number of test pits were excavated based on the distribution of architectural features. The chronology of the site includes three phases determined on the basis of stratigraphic and ceramic evidence: Early Yampara (AD 400–800), Classic Yampara (AD 800–1300) and Late Inka Yampara (AD 1300–1536) (Alconini 2005). Shortly after the Spanish conquest, the site seems to have been abandoned.

Faunal remains were recovered using ¼" (6.35 mm) screens. Taxonomic identifications were carried out in La Paz with the aid of reference specimens from the Colección Boliviana de Fauna. Standard zooarchaeological procedures of analysis were employed including quantifying element frequencies, recording cultural and non-cultural modifications and applying diversity and economic utility indexes (Lyman 1994; Reitz and Wing 1999).

Units of quantification employed include NISP, MNE, weight in grams, and for every taxon, MNI were derived comparing element sides, fusion stages, sizes, and proveniences. Whenever observed, cultural and non-cultural modifications were recorded. The intra-specific identification of camelids was supported by recording incisor morphology and osteometric measurements (Miller 2004; Moore 1989; Wheeler 1982, 1995; Wing 1972, 1988). Fusion stages of epiphyses were also recorded when observed as well as dental eruption and wear (Wheeler 1982, 1999).

Due to the absence of adequate reference collections and limited taxonomic studies for the project region, with certain exceptions, mollusks were only identified to the family level. Several human remains (all of them from non-funerary depositional events) were identified during the analysis and whenever possible, complementary demographic information was recorded (Buikstra and Ubelaker 1994).

Results

General patterns

The Yoroma archaeofaunal assemblage includes a number of taxa, of which the most abundant are camelids and mollusks, in addition to birds, fish, and other mammals (Tables 8.1–8.3). Human bones were also common, although none of them exhibited evidence of cultural

Phase	NISP	%	MNE	%	Weight	%	MNI	%	Contexts	%
Early Yampara (A.D. 400–800)	22	2.80	7	1.90	9.63	1.69	3	1.40	3	5.66
Classic Yampara (A.D. 800–1300)	312	39.69	161	43.63	184.44	32.42	87	40.65	17	32.08
Late Yampara Inka (A.D. 1300–1536)	452	57.51	201	54.47	374.92	65.89	124	57.94	33	62.26
Total	786	100	369	100	568.99	100	214	100	53	100

Table 8.1. Chronology and summary of identified specimens from the Yoroma archaeofaunal assemblage.

Class	Taxa	NISP	%	MNE	%	Weight	%	MNI	%
Mammalia	Camelidae	54	39.13	33	30.56	81	75.74	3	4.11
	Large mammal	8	5.80	6	5.56	9.85	9.21	3	4.11
	Akodon sp.	1	0.72	1	0.93	0.12	0.11	1	1.37
	Rodentia	3	2.17	3	2.78	0.46	0.43	2	2.74
	Small mammal	3	2.17	3	2.78	0.72	0.67	3	4.11
Aves	Indeterminate	4	2.90	4	3.70	2.67	2.50	3	4.11
	Egg-shell	4	2.90	1	0.93	0.1	0.09	1	1.37
Reptilia	Lacertilia	1	0.72	1	0.93	0.17	0.16	1	1.37
Osteichtyes	*Pimelodus* sp.	2	1.45	2	1.85	0.5	0.47	2	2.74
Mollusca	Bivalva	1	0.72	1	0.93	0.29	0.27	1	1.37
	Strophocheilus sp.	6	4.35	6	5.56	5.23	4.89	6	8.22
	Bulimidae	11	7.97	11	10.19	4.46	4.17	11	15.07
	Hydrorbidae	3	2.17	3	2.78	0.09	0.08	3	4.11
	Gastropoda	30	21.74	30	27.78	0.65	0.61	30	41.10
	Indeterminate	7	5.07	3	2.78	0.64	0.60	3	4.11
Subtotal		138	100	108	100	106.95	100	73	100
Non-funerary human remains		46		42		41.2		5	
Indeterminate		128		11		36.29		4	

Table 8.2. Frequencies and proportions of taxa identified at Yoroma for the Classic Yampara phase.

Class	Taxa	NISP	%	MNE	%	Weight	%	MNI	%
Mammalia	Camelidae	74	23.57	47	27.65	215.36	78.52	9	7.96
	Cervidae	1	0.32	1	0.59	2.93	1.07	1	0.88
	Large mammal	34	10.83	8	4.71	7.74	2.82	4	3.54
	Canidae	4	1.27	4	2.35	5.38	1.96	2	1.77
	Akodon sp.	9	2.87	5	2.94	0.61	0.22	2	1.77
	Cavidae	6	1.91	6	3.53	1.86	0.68	3	2.65
	Rodentia	5	1.59	4	2.35	0.23	0.08	2	1.77
	Small mammal	8	2.55	6	3.53	1.85	0.67	4	3.54
Aves	Anatidae	2	0.64	2	1.18	0.49	0.18	2	1.77
	Indeterminate	7	2.23	7	4.12	7.28	2.65	4	3.54
	Egg-shell	11	3.50	4	2.35	0.96	0.35	4	3.54
Osteichtyes	*Pimelodus* sp.	1	0.32	1	0.59	0.36	0.13	1	0.88
	Indeterminate	3	0.96	3	1.76	0.29	0.11	3	2.65
Mollusca	Bivalva	1	0.32	1	0.59	3	1.09	1	0.88
	Strophocheilus sp.	11	3.50	11	6.47	11.47	4.18	11	9.73
	Bulimidae	6	1.91	6	3.53	0.87	0.32	6	5.31
	Hydrorbidae	3	0.96	3	1.76	0.22	0.08	3	2.65
	Gastropoda	40	12.74	40	23.53	2.73	1.00	40	35.40
	Indeterminate	88	28.03	11	6.47	10.66	3.89	11	9.73
Subtotal		314	100	170	100	274.29	100	113	100
Non-funerary human remains		25		23		57.26		4	
Indeterminate		113		8		43.37		7	

Table 8.3. Frequencies and proportions of taxa identified at Yoroma for the Late Yampara Inka phase.

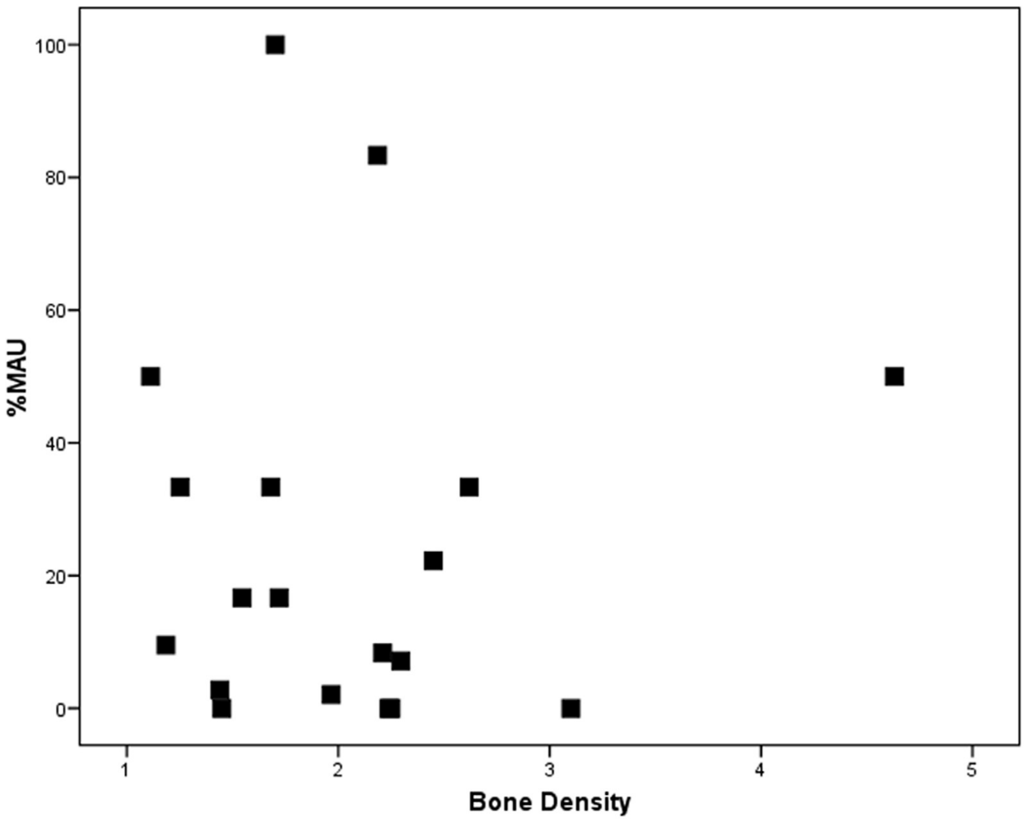

Figure 8.2. Scatter-plot comparing bone structural density and bone percentage of survival as measured by %MAU (sensu Lyman 1994). Camelid bone density values are derived from Stahl (1999). Spearman's rho rank-order correlation is low and statistically insignificant (r_s=-0.132; P=0.591; N=19).

modification. A number of burials were excavated from domestic areas and structures in Yoroma. Pre-abandonment disturbance of these deposits, sometimes tied to rites to the ancestors, might explain the high frequency of human bones encountered during the excavations.

The overall low number of identified specimens is related to the strong fragmentation, weathering, and poor state of preservation of bone remains in the region (*e.g.*, Aliaga 2001; Capriles and Domic 2005). Factors such as high level of erosion, low rate of sedimentation, strong solar radiation, ubiquitous floral bioturbation, and occasional agricultural plowing have significantly influenced in the negative preservation of most faunal remains. Nevertheless, the archaeofaunal assemblage recovered allows a preliminary assessment of the consumption and discard of faunal resources in Yoroma.

Only a few depositional events were identified to the Early Yampara phase (AD 400–800) when the site was probably a small village. A significant number of human burials were encountered during testing the earliest levels, and as well, only a very small assemblage of other faunal materials was recovered. Hence the osteological assemblage is dominated by human bone counts. Nevertheless, the most common consumed resources appear to be camelids, followed by birds.

For the Classic Yampara phase (AD 800–1300) the site grew and expanded to a major local settlement (Table 8.2). The fauna associated with this phase is very diverse as well as are the activities associated with its consumption. Camelid remains are still very important along with mollusks and other groups such as rodents, birds, and fish. Among the mollusks, a variety of taxa of different size, texture, and habitat was identified. This variety includes Bulimulid gastropods and the *Strophocheilus* snail that are associated with the manufacture of shell-beads. Some of these specimens were found intact. It is possible that the smaller snails (Hydrorbidae) were collected in the vicinity of the site and possibly consumed as food, although other mollusks such as *Strophocheilus* were probably imported.

During the Late Yampara Inka phase (AD 1300–1536) the diversity of taxa remains high; although some changes with relation to the previous phase are evident (Table 8.3). A greater consumption of camelids is evident and smaller changes in some taxa occurred, such as the presence of canids. Mollusks are still present and the manufacture of shell-beads continues. Just as in the previous phase, with the exception of *Akodon* sp., a small commensal mouse, differential preservation of rodents, birds, and fish elements suggests the procurement and consumption of local wild fauna.

Taxonomic diversity

To identify faunal consumption changes between Classic Yampara and Late Yampara Inka phases, evenness (V') and diversity (H') were calculated (Reitz and Wing 1999). Note that to derive the following values only MNIs were used, human bones were excluded, and taxonomic overlapping was avoided by running the analyses only to family level identifications. Six families were identified for Classic Yampara exhibiting a relatively even distribution of individuals (V'=0.85) and ten families representing a similarly equitable (V'=0.87) distribution were associated with Late Yampara Inka. Shannon-Weaver Diversity Index (H') determined that Late Yampara Inka (H'=0.87) was more diverse than Classic Yampara (H'=0.66). Differences in sample sizes and provenience units might partially account for these results, however, the fact that both phases show similar evenness values suggest that the observed pattern is significant. A tendency of broadening the kinds of faunal resources used and consumed in Yoroma through time is supported.

Camelids

Camelids are the most important consumed group represented in the Yoroma faunal assemblage. Four incisors of the guanaco/llama type corresponding to two individuals were identified (*sensu* Wheeler 1995). Osteometric information allowed the identification of five additional individuals as intermediate-size camelids (Moore 1989).

Across the site, four awls made expediently of long bones and a transversal clean cut first phalange, possibly a by-product of bead manufacturing, were also identified. Camelid specimens with evidence of cuts and gnaw marks are scarce as well as those modified by heat (<1% of the assemblage).

Overall, the camelid remains from Yoroma have very low percentages of survival (Fig. 8.2). However, the low correlation (Spearman's r_s=-0.132, *P*=0.591, n=19) observed between the element percentage of survival and the structural density values for South American camelids derived by Stahl (1999) suggest that structural density does not seem to be a major factor in their attrition. The observed differential preservation was consequently, probably produced by differential discard.

Considering the small sample size, skeletal elements were grouped into broad skeletal economic packages (*sensu* Mengoni-Goñalons 2001) and following Sandefur (2004) they were classified as either meaty or non-meaty. The meaty skeletal packages include the axial skeleton, ribcage, upper forelimbs, and upper hindlimbs and the non-meaty skeletal packages include the head and lower limbs (including metapodials). Note that meaty to non-meaty skeletal elements follow a continuum and that the classification made here follows Mengoni-Goñalons (2001) analysis of the economic anatomy of llamas which is slightly different than the classification used by Sandefur (2004). During Classic Yampara, the proportion between both types of packages favors the meatier packages, whereas during Late Yampara Inka, non-meaty packages increase significantly (Fig. 8.3).

Within the site, the western sector had the highest frequencies of camelid remains during Classic Yampara. For the Late Yampara Inka phase, camelid remains are mostly found in the northeast portion of the central sector, where an elite residential compound was built. Composed of three medium-size buildings and two patios, the compound was built over an artificial platform and included remains of several exotic items such as Inka Cuzco ceramics and copper bells (Fig. 8.1). During this time, food consumption activities apparently occurred beyond the domestic level, taking place in the elite's compound patios. Tied to these changes, there is a dominance of non-meaty elements in food serving activities. Despite the changes in the access to quality camelid meat, the elite residential compound had relatively higher access to camelid parts in comparison to other areas of the site. We can hypothesize that camelid meat was probably reserved for feastings in larger and politically more important Yampara or Inka sites (Capriles *et al.* 2008).

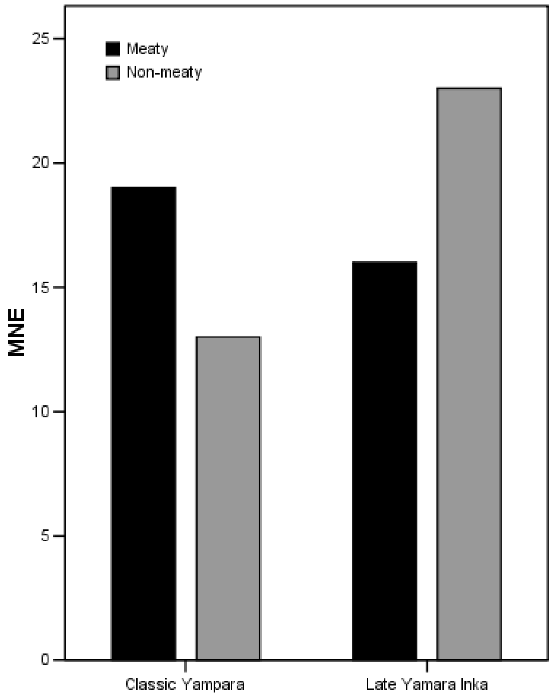

Figure 8.3. Meaty vs. non-meaty skeletal element representation for the Classic Yampara and Late Yampara Inka phases (N = 72).

Mollusks

The conspicuous presence of mollusks seems to be related to the specialized production of shell-beads, in addition to limited human consumption, and in few cases, ceremonial and funerary offerings (Fig. 8.4). Bead production occurred prior to the Inka control and did not change substantially afterwards, with the exceptions that most finished goods correspond to Late Yampara Inka funerary contexts. Shells and shell-beads seem to have been an important part of the ritual and mortuary paraphernalia associated with the possible cult to the ancestors that occurred at the site during this period.

During the Classic Yampara period, a lithic production

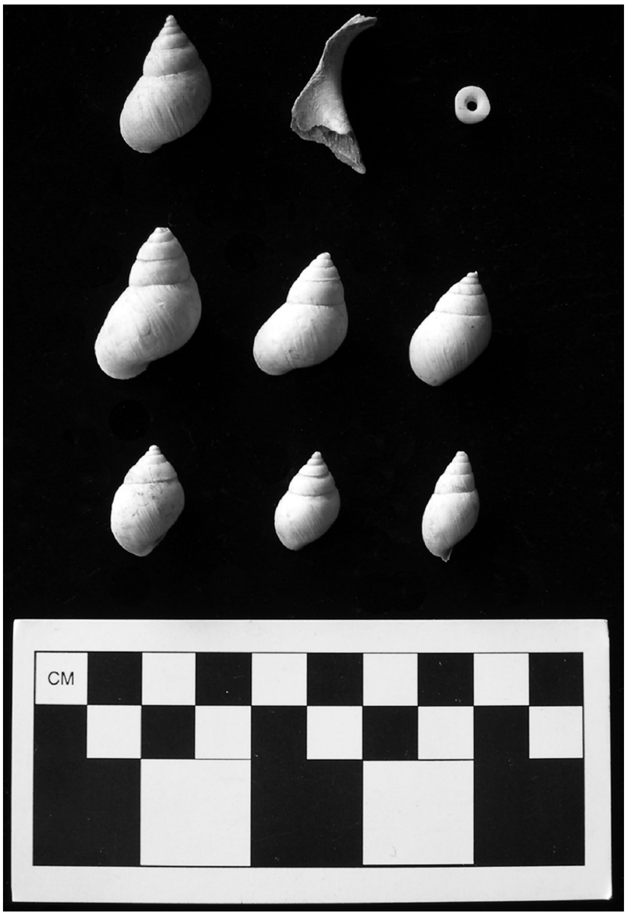

Figure 8.4. Bulimidae specimens, including a manufacture by-product and a shell-bead from Yoroma.

workshop was localized in the western sector of the site. Specialized lithic production, particularly of quartz projectile points, dominated the western sector, indicating a specialized labor segregation of this activity, perhaps under elite control. During the Late Yampara Inka phase, lithic production in that western workshop area intensified significantly (Alconini 2008).

In contrast, considerable concentrations of mollusk remains were found in both domestic and elite spaces throughout the site. Thus, while lithic production took place apparently only in one specialized workshop area, shell craft manufacture may have occurred at a household level throughout the site. Blom and Janusek (2005) have also reported evidence for the production of beads in several sites in the adjacent valley of Icla. In certain Yampara sites, the production of shell-beads seems to have been a significant economic activity, which implied efficient systems of access to raw materials.

The available evidence suggests that Yoroma participated in the long-distance trade and exchange circuits that connected the cold arid highlands with the tropical lowlands. Foreign styles of pottery and particularly lowlands ceramics were found in Yoroma, reinforcing the importance of exchange during both pre-Inka and Inka times. In addition, the use of star-sheet copper bells in elite and funerary contexts indicates that Yoroma maintained trade relations with distant areas, perhaps northwest Argentina and northern Chile, where these artifacts are common (Alconini 2005). It is possible that some of the observed snail species (Bulimidae, Hydrorbidae) were collected from the vicinities of Yoroma. However, some mollusks species suggest exchange networks that extended to the Pacific coast where some of the bivalves found at Yoroma were procured, and to the Chaco lowlands, the natural habitat of *Strophocheilus*. Téllez (1997) has emphasized the importance and abundance of exotic *Strophocheilus* shells in funerary contexts at San Pedro de Atacama and our recent findings reinforce their widespread circulation throughout the south central Andes as well as their association with the afterlife.

Discussion and Conclusions

The consumption and utilization of fauna in Yoroma was diverse. The Inka conquest does not seem to have changed dramatically preexisting patterns of faunal utilization. A greater diversity of taxa used and discarded at the site however, is noted for the Late Yampara Inka occupation of the site. The production of shell-beads was an important activity that continued throughout the occupational sequence at the site without any significant modifications. The consumption of camelids, particularly intermediate-size individuals, does not seem to augment significantly either. Nevertheless, burned areas and abundant fragments of ceramic serving vessels, suggest that public feasts promoted by local elites with the support of the Inkas occurred later at the site, perhaps involving other organic materials, including maize. Interestingly enough, the few camelid remains leftover from these activities now are dominated by non-meaty elements.

Archaeological evidence from other contemporary sites suggests that the Inka control produced a significant increase in the consumption of domesticated camelids, leveling their overall consumption, and generating a more balanced access to meaty skeletal elements between elites and commoners (Sandefur 1988, 2004). The evidence from Yoroma shows that this pattern does not hold everywhere. This might correspond to the nature of the preexistent Yampara economy. Yampara people did not practice pastoralism nor have direct access to domesticated camelids because their territory was localized in the dry intermediate valleys of the eastern Andes. Their economy was based primarily on maize, chili, coca, and other lowland products (Gade 1999; Julien 1995). Camelid remains are consequently a byproduct of exchange networks. It is also possible that camelid meat arrived as *ch'arki* (dried camelid meat) tied with low utility skeletal elements or without skeletal elements at all (Browman 1989; Stahl 1999). Unfortunately, the sample sizes of Yoroma camelid specimens are too small to test either alternative. Finally, it seems fair to suggest that the advent of the Inka and their construction of large regional centers at the Pucara de Oroncota settlement system might have directed larger changes in the faunal consumption of the region, not observable in Yoroma. The investigation of other Yampara sites is required to verify or reject these hypotheses.

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9. Living on the Frontier: "Scythian" and "Celtic" Animal Exploitation in Iron Age Northeastern Hungary

László Bartosiewicz and Erika Gál

By the 5th–3rd c. BC, present-day Hungary fell under the influence of three distinct cultural formations. While Scythian Period pastoralists still occupied the Great Hungarian Plain, the eastward expansion of Celts reached the northern border of this area as the Eastern Hallstatt culture withdrew from Western Hungary. Animal remains from five settlements were used in characterising Iron Age lifeways in the zone between the Great Hungarian Plain and the Northern Mountains. "Steppe elements" of the domestic fauna, sheep/goat and horse tend to dominate and were important even at the "Celtic" settlement of Sajópetri, distinguished by hunting from previous "Prescythian"/Scythian Period settlements. Grave goods from coeval Celtic cemeteries in the region, however, show Celtic tradition in the dominance of pig remains.

Keywords: Iron Age animal exploitation, Scythian Period, Celtic Period, Carpathian Basin

Introduction

In Hungary, the first evidence of iron use dates to the 8th c. BC. The Iron Age lasts until the establishment of the Roman province of Pannonia during the AD 1st c. in Transdanubia, west of the Danube. It is characterised by tumultuous events that differed between the southeastern and western sections of the Carpathian Basin. In this paper the term frontier is used for a zone of transition that lies between political and administrative units of varying complexity or, more importantly, between such a unit and its hinterland where no matching entity exists (Prescott 1987, 36–37). Three areas may be defined along the courses of two principal rivers:

- the Tisza river Valley, forming the core area of the Great Hungarian Plain in the southeast,
- the Danube marking the border of hilly Transdanubia towards the west,
- the foreland of the Northern Mountains, north of the Danube–Tisza interfluve in the Great Hungarian Plain.

A rigid view of "natural boundaries" (Ratzel 1895, Curzon 1907, Pounds 1951) imposes a modern *topos* on ancient frontiers, presuming that human occupation was largely defined by geographic barriers (Prescott 1987), a concept also applied for prehistoric Hungary (Sümegi *et al.* 2002). The situation, however, has been more complex, even in the case of most unambiguously defined rivers, efficient barriers in a transversal sense (*cf.* the Danubian *limes*), but passages and means of communication lengthwise, *e.g.* during the Celtic advancement into the Carpathian Basin along the Danube Valley (Szabó 2005, 15). Ecotones, *i.e.* interfaces between different natural habitats also serve as areas of increased contact, with access to resources from either side of a zone that combines advantages of both. During the Iron Age the foothill area focal to this paper was peripheral relative to both the Great Hungarian Plain and Transdanubia. However, it was near resources of iron ore. Its complex role as a valuable zone of transactions is indicated by the distribution of Iron Age archaeological sites in Fig. 9.1. Animal bone assemblages from five sites in this section represent three major groups, the widely debated "Prescythians", Scythians and Celts. These terms are used not to describe intangible ethnic affiliations, but assemblages distinguished on the basis of artefactual evidence for their respective material cultures.

Iron Age in the study area

"Prescythian" is a contradictory term, applied to a vaguely defined group of equestrian people (Gallus and Horváth 1939), who supposedly arrived from southeast into the area of the Late Bronze Age Gáva and Kyjatice cultures in eastern Hungary. Additional southeastern contacts in the 7th c. are indicated by the occurrence of luxury artefacts (weapons, horse tacks and jewellery) in the Great

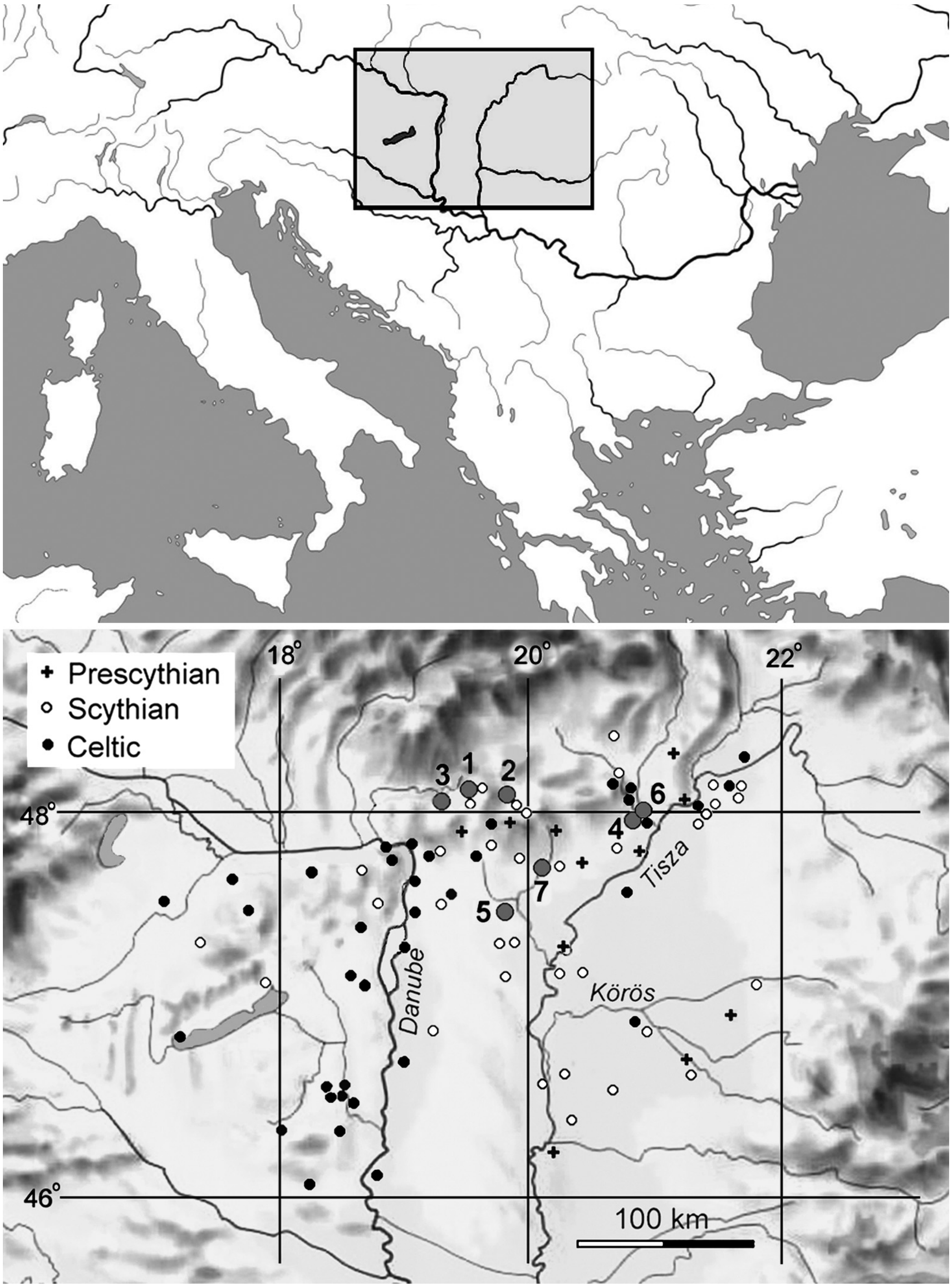

Figure 9.1. Top: The location of the study area in east Central Europe. Bottom: The geographical distribution of Prescythian,„Prescythian”/Scythian and Celtic Period sites in Hungary and the settlements discussed. Legend: 1=Ludányhalászi, 2= Salgótarján, 3=Balassagyarmat, 4=Hejőkeresztúr, 5=Jászfelsőszentgyörgy, 6=Sajópetri, 7=Ludas.

Hungarian Plain, in *Thraco-Cimmerian* style. Recently, frontier research has offered a conceptual framework within which attention turned from core polities to such peripheral zones (*e.g.*, Chase-Dunn and Hall 1991). Possibly, fundamental changes in the discussed area during the 9th c. BC resulted from shifts in the environment, forcing local populations to develop a pastoralist lifestyle with contacts across the Carpathians toward the east: the hypothesised immigration of populations could not be reconfirmed (Metzner-Nebelsick 2000, 165).

Importantly, Gallus and Horváth (1939) clearly distinguished between “culture” and “race”, in that culture can develop with changing ethnic characteristics of people sharing it and that a group of continuous characteristics may change almost completely its culture. This was a significant step forward, considering that, in the absence of written data, allegoric migrations, invasions of and even feuds between “cultures” represented by artefact styles, have dominated historical theories in prehistoric archaeology. Iron Age archaeology in Hungary is the first to have at least indirect written references. Scythians and Celts were treated in numerous classical sources, as they interfered with the Mediterranean World. The names of the northern towns in Ptolemy's list indicate Celtic origins (Vaday 2003a). Information on Scythians and Celts, however, reflect how inhabitants within major Graeco-Roman polities saw them, often representing *topoi* toward occupants of the hinterland without.

The final Early Iron Age began around 750–700 BC, when western Hungary belonged to the self-contained Hallstatt culture (Szabó 1971, 10). In "*The Histories*" (5th c. BC), Herodotus (v. 9) mentioned *Syginnae*, who dwelt beyond the Danube and are identified with the Scythians, whose culture first emerged in the Great Hungarian Plain around the turn of the 7–6th c. BC (Kemenczei 2000, 51).

Celts first appeared at the Pannonia-Noricum border in the northwest during the 5th c. BC, while material culture in the Great Hungarian Plain shows trans-Carpathian contacts, with cultures under Scythian influence in the forest steppe, along the Dniepr and Dniester rivers. By the 4th c. BC the Eastern Hallstatt culture disappeared from Hungary. Celts occupied Transdanubia, and stretches toward the northeast, the region studied here, beginning to create 'Celticized' areas with a substantial non-Celtic element. Celtic sites in the Great Hungarian Plain are first documented from the second third of the 3rd c. BC, mostly along the right bank tributaries of the Tisza. Increasing Celtic occupation suggests that late 3rd c. BC Celtic campaigns against Hellenistic centres were launched from the Carpathian Basin (Szabó 2005, 31).

Since no sources refer in detail to either Scythians or Celts in northeastern Hungary, they can only be tentatively identified using their archaeological heritage from what was the fringes of their respective distribution areas. Animal remains can elucidate differences and similarities between these major Iron Age groups. While it is erroneous to single out any category of artefacts and equate it with "culture", it may be hypothesised that food habits and basic forms of subsistence (such as pastoralism *vs*. hunting) reflect cognitive attitudes towards animals, being conservative and culturally idiosyncratic.

Archaeozoological assemblages

Iron Age archaeozoological assemblages are scarce in Hungary. Similarly to high status artefacts, the overwhelming majority of animal remains originated from burials reflecting mortuary behaviour rather than everyday life. Settlement studies, therefore, have a key role in expanding our knowledge of the Hungarian Iron Age in this complex region.

The earliest animal bones originate from the so-called "Prescythian" settlement of Ludányhalászi–Sóderbánya (Fig. 9.1: Site 1), associated with the Late Bronze Age Kyjatice culture that survied until the Hallstatt C Period inside hilly regions, but pre-dates the 6–4th c. BC Scythian Period. Ludányhalászi was located at an altitude of 130 m in a valley of the Northern Mountains. A material of pivotal importance in this paper is the large, predominantly Scythian assemblage from Salgótarján–Ipari Park II (Fig. 9.1: Site 2). It dates from approximately 650 to 450 BC, largely the Scythian Period, but its location in another valley among the mountains (300 masl) was at a distance from "proper" Scythian territories in the lowlands. Sporadic occurrences of Late Bronze Age Gáva and Kyjatice as well as Iron Age Hallstatt style ceramics at the site illustrate the Prescythian situation (Vaday 2003b: 34), Lacking absolute dates, however, the typochronological dating of Scythian Period artefacts seems to span a broad time interval.

A reasonably large assemblage of over 300 identifiable Scythian Period bones came from Balassagyarmat–Káposztások (Fig. 9.1: Site 3) in yet another valley at 130 m. Previously, animal bones had been known only from two Scythian Period settlements. One represented a single pit at Hejőkeresztúr (Bökönyi 1958; Fig. 9.1: Site 4), whose 15 bone fragments do not lend themselves to reliable interpretation. Even the material from Jászfelsőszentgyörgy–Túróczi-tanya (Bökönyi 1974; Fig. 9.1: Site 5 at 100 masl), corresponds to only 1/3 of the Balassagyarmat assemblage.

Celtic influx is represented by the Sajópetri–46 settlement (Fig. 9.1: Site 6). It covered the areas of Sajópetri–Hosszú-dűlő and Sajópetri–Hosszú-rét and yielded almost 2500 identifiable animal remains from the La Tène B2–C1 Periods, the 3rd c. BC. In addition to pottery from this period, shards from hand-thrown Scythian ceramics were also found at the site (Szabó *et al*. 2004, 27–28). The settlement was located on an alluvial terrace (120 m asl). Animal offerings from the largely contemporaneous La Tène Period cemetery at Ludas–Varjú-dűlő (Szabó and Tankó 2006; Méniel 2006; Fig. 9.1: Site **7**) have also been taken into consideration.

These settlements (Fig. 9.1) fall within the zone of overlap between the consecutive cultures concerned. They represent hypothetical intrusions, first from southeast, then from northwest. Frontiers may also be perceived between sedentary agrarian and mobile pastoral subsistence systems and their related ideologies (Eaton 1993). Differential exploitation of natural resources has contributed significantly to frontier dynamics in this region. Cultural differences, therefore, may be expected along the fringes of these peripheral power zones. The major settlement assemblages are summarised in Table 9.1.

Results

Livestock and meat consumption

Domesticates in Table 9.1 were reviewed in quantitative terms (NISP). Given the differences between sample sizes, the five sites are difficult to compare. Expected values calculated for testing the homogeneity of distribution for these animal remains are listed in Table 9.2.

The small assemblage of Late Bronze Age Ludányhalászi contained unexpectedly great numbers of pig bone. The "Prescythian"/Scythian assemblage from Salgótarján is characterised by a sheep/goat NISP greater than the

Settlement	**Ludány-halászi**	**Salgó-tarján**	**Balassa-gyarmat**	**Jászfelső-szentgyörgy**	**Sajópetri**
Code in site map (Figure 1)	**1**	**2**	**3**	**5**	**6**
Analyst (Gál=EG, Bartosiewicz=LB)	EG	EG, LB	EG	S. Bökönyi	LB, EG
Relative chronology, period	Prescythian/Scythian		Scythian		Celtic
Cattle (*Bos taurus* Linnaeus, 1758)	95	1695	88	58	995
Sheep (*Ovis aries* Linnaeus, 1758)	2	186			87
Goat (*Capra hircus* Linnaeus, 1758)	1	58			16
Sheep/goat (Caprinae Gray, 1821)	95	1425	103	17	428
Pig (*Sus domesticus* Erxleben 1777)	81	454	49	5	255
Horse (*Equus caballus* Linnaeus, 1758)	4	119	6	23	108
Horse/Ass (*Equus* sp.)		10			3
Dog (*Canis familiaris* Linnaeus, 1758)	33	92	10	1	71
Domestic hen (*Gallus domesticus* Linnaeus, 1758)			2	1	9
Aurochs (*Bos primigenius* Bojanus, 1827)		7		1	3
European bison (*Bison bonasus* Linnaeus, 1758)		20			2
Red deer (*Cervus elaphus* Linnaeus, 1758)	2	36		1	273
Roe deer (*Capreolus capreolus* Linnaeus, 1758)	2	14	2		20
Wild pig (*Sus scrofa* Linnaeus, 1758)		9		1	9
Hedgehog (*Erinaceus europaeus* Linnaeus, 1758)					1
Brown bear (*Ursus arctos* Linnaeus, 1758)		1			
Red fox (*Vulpes vulpes* Linnaeus, 1758)			2		2
Badger (*Meles meles* Linnaeus, 1758)					2
Brown hare (*Lepus europaeus* Pallas, 1778)	1	14	5		14
Beaver (*Castor fiber* Linnaeus, 1758)					42
Hamster (*Cricetus cricetus* Linnaeus, 1758)		14			
Souslik (*Citellus citellus* Linnaeus, 1758)		2			
Rodent (Rodentia Bowdich, 1821)	5	2	1		
Cormorant (*Phalacrocorax carbo* Linnaeus, 1758)					1
Greylag goose (*Anser anser* Linnaeus, 1758)			1		1
Mallard (*Anas platyrhynchos* Linnaeus, 1758)					2
Ferruginous duck (*Aythya nyroca* Güldenstadt, 1770)					1
Goshawk (*Accipiter gentilis* Linnaeus, 1758)		1			
Jackdaw (*Corvus monedula* Linnaeus, 1758)		6			
Crow (*Corvus frugilegus/C. corone*)		1			
Starling (*Sturnus vulgaris* Linnaeus, 1758)	1				
Catfish (*Silurus glanis* Linnaeus, 1758)	2				
Large ungulate	23	268	5		250
Small ungulate	23	139	5		26
Mammal indet.	5		3		
Bird indet.			2		0
Amphibian indet.	1				
Fish indet.	1				
Total	**377**	**4573**	**284**	**108**	**2620**

Note: The small Scythian assemblage from Hejőkeresztúr is not listed. It contained 14 remains of domesticates (cattle, caprine, horse and dog). The only bone of interest is a bison metatarsus (Bökönyi 1958: 75), given the rarity of this species in Holocene Hungary (Bartosiewicz 1999), and its presence at nearby Sajópetri and Salgótarján. Animal remains from the Celtic cemetery at Ludas–Varjú-dűlő will be treated during the discussion.

Table 9.1. Comparative table of the number of identifiable bone specimens (NISP).

expected value. The same holds true for the Scythian assemblage from Balassagyarmat. This trend falls in line with the "steppe" character of Scythian culture. Cattle and horse bones occur in unexpectedly great numbers at sites in open landscape, Scythian Jászfelsőszentgyörgy in the Great Hungarian Plain and Sajópetri near the Tisza valley.

The percentages of NISP values are shown in Fig. 9.2 with sites sorted by the decreasing ratio of sheep/goat NISP

	Cattle		Sheep/goat		Pig		Equid		Total
	O	E	O	E	O	E	O	E	
Ludányhalászi	95	126.6	98	104.2	***81***	36.4	5	11.8	**279**
Balassagyarmat	95	114.8	***103***	94.5	49	33.0	6	10.7	**253**
Salgótarján	1695	1803.5	***1669***	1474.1	454	514.6	129	167.0	**3947**
Jászfelsőszentgyörgy	***58***	46.7	17	38.5	5	13.4	***23***	4.4	**103**
Sajópetri	***995***	858.6	531	706.7	255	246.7	***111***	80.1	**1892**
Total	**2938**		**2418**		**844**		**274**		**6474**

A χ^2 test using these data showed heterogeneity on the $P \leq 0.001$ level of probability, indicative of statistically significant differences in the composition of settlement refuse.

Table 9.2. Data used in testing the homogeneity of contributions by domestic ungulates. O= observed value, E= expected value. Markedly high values are in ***bold italics.***

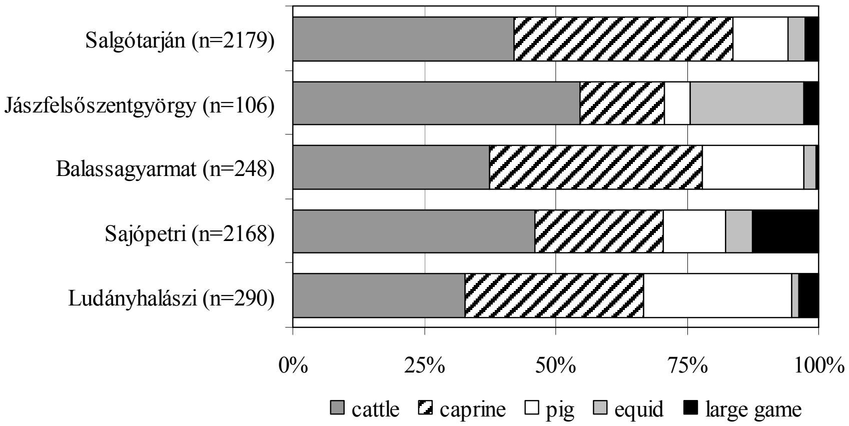

Figure 9.2. The percent contribution of major meat animals sorted by the proportion of sheep/goat to pig NISP.

	Cattle		Sheep	
Site/Period	Salgótarján	Sajópetri	Salgótarján	Sajópetri
N	9	16	8	8
Mean	98.3	109.0	59.1	59.6
Standard deviation	9.1	7.6	3.9	3.9
Minimum	84.3	93.3	55.2	55.2
Maximum	110.0	121.0	67.5	66.0
Median	98.7	109.0	58.3	58.2
t-value	-3.17		-0.244	
Degrees of freedom	23		14	
Probability	0.004		0.810	

Table 9.3: Withers height (cm) estimates for Scythian (Salgótarján) and Celtic Period (Sajópetri) cattle and sheep.

relative to those of pig. Salgótarján, Jászfelsőszentgyörgy and Balassagyarmat reflect "Scythian", mobile pastoral patterning in the exploitation of domestic ungulates. The percentage of caprine remains consistently exceeds that of pig bones. In addition to domestic ungulates, large game (pooled values for wild bovines, deer bone and wild pig) were included. Their contribution is greatest at Sajópetri, and this site also fits the decreasing trend of mobile pastoralism. Ludányhalászi at the bottom of Fig. 9.2, shows the most "sedentary" pattern of animal exploitation.

Withers height estimates for cattle (Zalkin 1960), sheep (Teichert 1969) and horse (Kiesewalter 1888) could be performed on complete long bones found in sufficiently great numbers at Salgótarján and Sajópetri. Student's t-tests comparing the significance of size differences between periods are shown in Table 9.3.

Celtic Period cattle were 10 cm taller than the early Iron Age form identified from Salgótarján. This difference reflects situations centuries apart, but seems characteristic of the respective cattle populations. Three bulls were identified at Sajópetri using the slenderness criteria by Nobis (1954), however, they were not particularly large, therefore would not have distorted the basic size distribution. The 109 cm mean withers height may be considered large compared to meagre Celtic cattle reconstructed from 1st c. BC *oppida* (Szabó 2005, 89).

On the other hand, no difference was found between the stature of sheep. Both groups fall behind even the withers heights of unimproved modern breeds in Hungary (Bartosiewicz 2006, 38). Two goats from Salgótarján measured 108 and 114.5 cm at the withers (Schramm 1967). Fragments of relatively large goat horn cores were also identified.

Fourteen complete horse long bones from Sajópetri resulted in a mean withers height of 123 cm (113–134 cm, standard deviation=6.7 cm), smaller than the estimates for two individuals from Salgótarján (128.9 and 144.7 cm). Although this difference cannot be tested statistically, it falls in line with the frequently emphasised larger size of Scythian horses compared to their "western" kin (Bökönyi 1968, 41; Szabó 2005, 88). Fig. 9.3 includes Scythian horses from Szentes–Vekerzug (Bökönyi 1952, 1954) whose large size contradicts Herodotus (v. 9), who wrote that the horses of Syginnae were small and shaggy, too weak to bear a rider, but when yoked to chariots, they were among the swiftest.

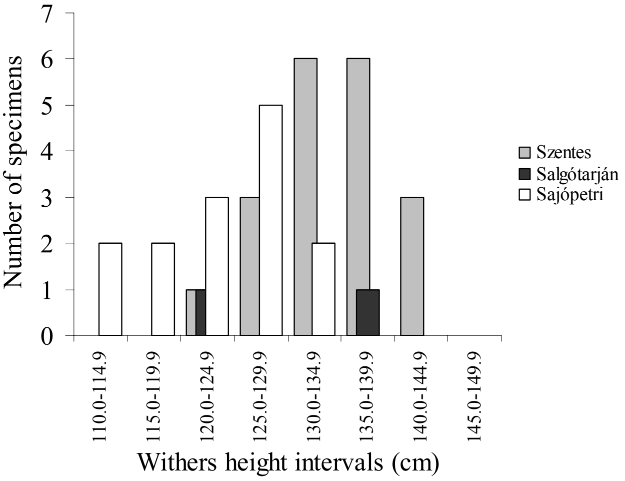

Figure 9.3. Withers height distributions for Scythian (Salgótarján and Szentes) and Celtic Period (Sajópetri) horses.

Skeletal element	Side	length, mm	age, weeks
Scapula	dex.	63.0	29.0
Humerus	sin.	54.1	25.0
Radius	sin.	71.1	26.0
Tibia	sin.	69.1	25.0
Mean Age	-	-	26.3

Table 9.4. Age estimates for the horse foetus found at Salgótarján.

Non-measurable bone fragments of small equids also surfaced both at Salgótarján and Sajópetri. They are certainly larger than the remains of donkeys. Bones of this size may originate from mules. According to Aristotle (605a, 16) donkeys withstand cold very poorly, therefore they are not kept in Pontos and Skythia. Archaeological evidence for mules/hinnies, however, has been reported from Greek colonies in the northern Pontic region (Bökönyi 1974, 306) that had contacts with both communities under discussion here.

The percentages of ageable animal bones are identical in the two largest assemblages (Fig. 9.4). They rather reflect the biological characteristics and exploitation of livestock than cultural patterning. Forms of secondary (*i.e.*, non-meat related) exploitation depend on longevity. Valuable horses, rarely eaten lead this list. Owing to exploitation for milk (bovids), draught power (cattle) and wool (sheep), domestic ruminants at both sites yielded more bones representing only slightly younger age groups. Finally, prolific, single meat purpose pigs are killed at the youngest age.

Feature 17 at Salgótarján contained bones from a foetal horse used in estimating the time of conception (Table 9.4; Prummel 1989, 75). Foaling takes place in April–May, the obtained 6.5 months of foetal age is indicative of the animal's death in the middle of the winter. It is impossible to tell whether the dam died or abortion took place, a familiar problem in the interpretation of foetal remains (Bartosiewicz 1995, 88, Plate 15).

A dog radius from Ludányhalászi yielded a withers height of 55.4 cm, while a humerus from Salgótarján resulted in an estimate of 53.7 cm (Koudelka 1885). These Scythian dogs were not only of medium size, but a skull preserved at Salgótarján is reminiscent of unimproved cranial types

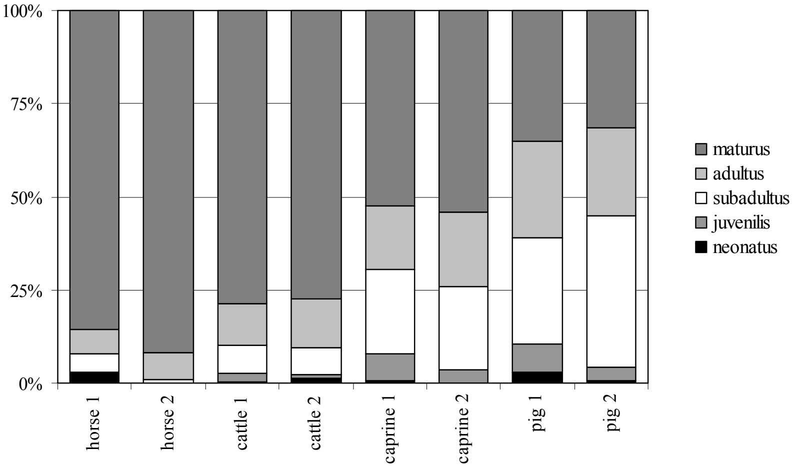

Figure 9.4. Distributions of ageable bones from domestic ungulates at Salgótarján (1; n=1931) and Sajópetri (2; n=1106).

of Skye terriers or Hungarian Pulis (Bartosiewicz *et al.* 2006). Such forms occur in prehistoric dog populations lacking conscious human selection for special breeds (Bartosiewicz 2002). Although only disarticulated dog skeletons were found, it seems unlikely that dog-eating (known from Celtic times; Szabó 2005, 89) was practised at any of these sites.

The recovery of two Scythian Period femur fragments from domestic hen at Balassagyarmat deserves special attention. While hen was domesticated in South-East Asia, its monophyletic or polyphyletic origins as well as the way(s) and time of introduction to Europe are still unclear (Stevens 1991; Boev 1995). It has been hypothesised that domestic hen was already present in some areas during the Neolithic and Early Bronze Age, although its spread dates to the Iron Age (West and Zhou 1988; Carrasquilla 1992). Data from Bulgaria suggest that this happened already at the end of the Bronze Age (Boev 1995). According to hen remains found in graves and settlements in Central Europe, the earliest evidence for this species has been dated to the Late Hallstatt Period in this region (Benecke 1993). In addition to the Scythian specimen from Jászfelsőszentgyörgy (Bökönyi 1974), the finds from Balassagyarmat offer the earliest evidence for domestic hen in the Carpathian Basin.

Celtic finds of domestic hen are more common. In addition to the nine specimens identified among the food remains in Sajópetri, remains of 5 juvenile, two subadult and an adult skeleton were reported from the La Tène cemetery of Ludas–Varjú-dűlő (Méniel 2006, 360). By this time, domestic hen occurs at Transdanubian settlements as well. For example, skeletons of a subadult chicken and a crane (*Grus grus* Linnaeus 1758) each (as well as a single bone of a juvenile crane) were found in three Celtic Period pits at Balatonkeresztúr–Réti-dűlő (Gál 2007a).

Taxonomic richness: hunting and fowling

Animal remains found in small numbers also carry valuable information. Remains of rare animals (birds, fur bearing game *etc.*) are more likely to occur in large samples. Relationships between assemblage size (NISP=x) and the number of species identified (y) are described by a degressive exponential relationship: The number of animal species increases along with the number of identifiable bone specimens, until a point where it starts lagging behind as the repertoire of animal species is exhausted. Comparisons between faunal assemblages of radically different sizes, therefore, may be heavily biased: the number of species also reflects the number of bones studied (Grayson 1984, 136–137), not only the culturally idiosyncratic number of animal taxa. The relationship between assemblage size (x) and the number of taxa (y) at the sites under discussion here is described by the following equation:

$$y = 4.691x^{0.168}$$
$$(R^2 = 0.907)$$

The 0.168 exponent in this equation is high compared to, for example, the value of 1.292, calculated for 53 Neolithic sites

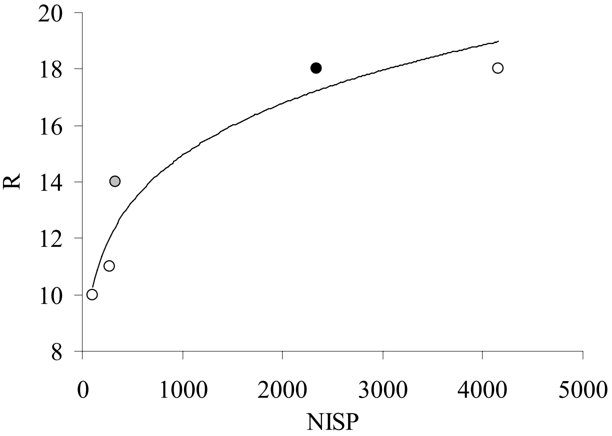

Figure 9.5. The relationship between assemblage size (NISP) and taxonmic richness (R). Legend: gray="Prescythian"-, white=Scythian-, black=Celtic Period.

(Bartosiewicz 2005, 59). The coefficient of determination (R^2) confirms that there is 90% interdependence between assemblage size and the number of taxa identified. In Fig. 9.5, Scythian Period settlements fall below the trendline representing this equation, showing a rather monotonous, "nomadic" exploitation of domesticates. It shows that although the Salgótarján assemblage contains remains from a great number of taxa, this is partly the result of sample size. "Prescythian" Ludányhalászi and Celtic Period Sajópetri have a greater inventory of species than expected on the basis their sizes. Sources of this taxonomic richness are non-domestic animals.

At Ludányhalászi, both deer species and brown hare were present. A special, Late Bronze Age, Gáva culture-style deposit of pots in Pit 4 yielded skull-, long bone- and tooth-remains from cattle and sheep or goat. Most interestingly, a mandible fragment from starling was also found in this special feature. It is likely that the head of the bird was buried and the fragile calvarium was destroyed pre- or post-excavation. So far starling has been reported only from one prehistoric site in Hungary: the Early Neolithic (Körös culture) settlement Ecsegfalva 23 yielded six remains from two individuals (all those bones were from the wing: four humeri and two ulnae; Gál 2007b).

Bones of wild pig, aurochs and bison, occur only in the two largest assemblages. Of these, the occurrence of bison is of special interest. Its bones characterise a forested foothill habitat where its rare finds were encountered until the early Middle Ages (Vörös 1989, 1990). With the exception of Balassagyarmat, bones of red deer regularly occur and roe deer is present as well (antler fragments were not included in this part of the material unless found attached to the skull).

The bird remains from Salgótarján represent species living in rocky (jackdaw) woodland (goshawk) and forest-steppe (crow) environments. Goshawk and crow yielded one bone each, while jackdaw contributed six remains from a single individual. Since most of the latter were complete, it has been suggested that the bird died by natural reasons and/or it was buried (Bartosiewicz and

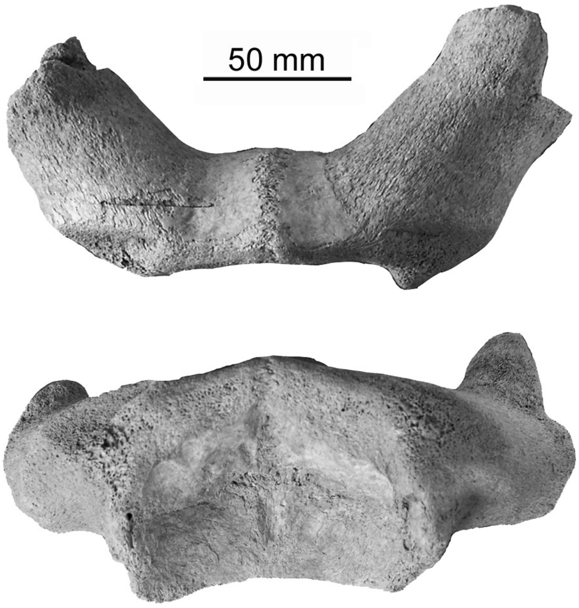

Figure 9.6. Worked stag neurocranium with broken antler from Sajópetri. A cut mark is visible in the frontal view (top). Weathering is less pronounced inside the brain case (bottom).

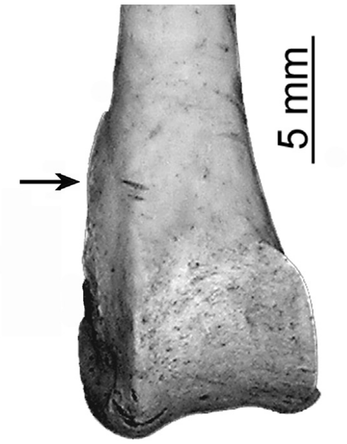

Figure 9.7. Fine metal cutmarks on the tibiotarsus of a mallard from Sajópetri.

Gál, in press). All three species are part of the Hungarian avifauna year-round.

Distinguishing bones of domestic goose from its wild ancestor, grey-lag goose, is one of the hardest tasks in archaeo-ornithology. It is usually successful only in the case of morphological features and osteometric characteristics of certain skeletal parts. Since grey-lag goose is present throughout Europe and Asia, the time and place of domestication is unknown, only written sources provide reliable evidence of goose keeping. Therefore, the single Scythian Period goose bone from Balassagyarmat, a fragmentary coracoideum, has been assigned to the wild form.

The assemblage of Celtic Period Sajópetri is the only where the contribution of wild animal bones exceeded 10%. Much higher percentages of wild animal bones were observed at Celtic sites in Transdanubia, especially in the Celtic layers of Gellérthegy-Tabán (Matolcsi 1979) and Corvin Square (Lyublyanovics, this volume). Celtic burials of complete stags are also well known across Hungary (*e.g.* Vörös 1986; Bartosiewicz 2004). Although no such deposit was discovered at Sajópetri, a curious skull fragment with the broken stubs of both antlers was recovered among the red deer bone (Fig. 9.6).

Another rare find in the large Salgótarján assemblage was the distal half of a left humerus from a brown bear (Feature 13). It is as much an indicator of forested hilly habitats as of sufficiently large sample size. Bones of other carnivores (including burrowing badger and red fox) occurred sporadically. These may have also been exploited for fur the same way as beaver, identified in great numbers at Sajópetri, also reflecting the location of this settlement on a forested river terrace.

Archaeo-ornithological data show the same type of habitat, since bones of waterfowl were recovered almost exclusively from Sajópetri. Mallard and ferruginous duck – among the four bird taxa identified in this assemblage – live in fresh waters. The latter prefers smaller ponds or lakes. It usually nests in thick reed beds and also in the crown of small willows in the case of mallard. Cormorant prefers gallery forests since its nest is made in trees. Grey-lag goose is a wetland species that forages over both grasslands and swamps, and nests on the ground. Ferruginous duck also feeds on plant materials such as roots, seeds, green leaves, *etc*. Mallard is omnivorous, while cormorant feeds entirely on fish.

All four wild fowl are summer visitors in present day Hungary, arriving in early spring and leaving in late autumn. Mallard and ferruginous duck may overwinter in the region when food is available during mild winters. Owing to different availability, greater taxonomic diversity and the reduced numbers of bones within the skeleton, taxonomic richness among birds increases more intensively with assemblage size than among mammals (Bartosiewicz and Gál 2007). The exploitation of wild birds, therefore, contributed significantly to taxonomic richness at Sajópetri.

In the absence of water-sieving, only three large fish bones (two originating from catfish) were recovered at Ludányhalászi, and a perforated catfish vertebra was also brought to light at Sajópetri.

Modified animal bones

Although a detailed study of butchering methods is beyond the capacity of this paper, cut marks on many bones originate from metal implements. By the 3rd c. BC most iron tools had evolved to forms that survived almost unaltered until the industrial revolution (Szabó 2005, 86). In addition to heavy tools and agricultural equipment, evidence of fine metal knives is shown by butchering marks. One of the tibiotarsi from a mallard at Sajópetri (House no. 95) displays two short, parallel cut marks on the

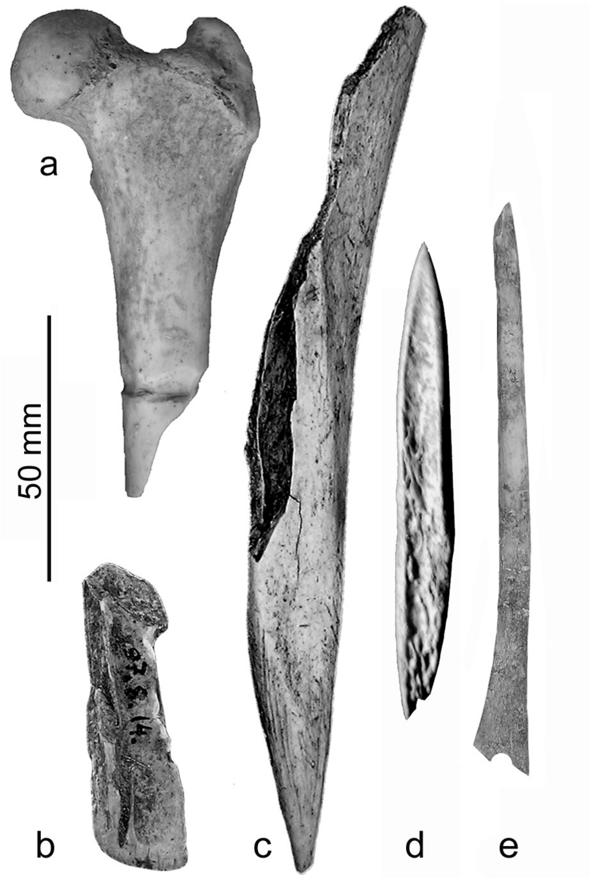

Figure 9.8. Late Bronze Age "Prescythian"/Scythian bone tools: a. Dog femur used as raw material at Salgótarján; b. Small chisel made of a caprine metapodium from Ludányhalászi; c. Distal end of a Type 1/15 large ulna point from Ludányhalászi; d. Small, Type 2/1 double point from Salgótarján; e. broken needle made on a long bone splinter from Balassagyarmat.

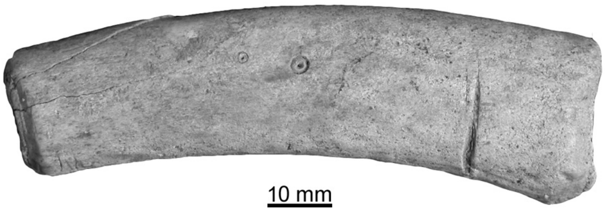

Figure 9.9. Decorated and worn goat horn core segment from Salgótarján.

caudal-distal part, clearly indicative of careful secondary butchery using a fine blade (Fig. 9.7).

While burn marks on the bones found in the settlement materials cannot be unambiguously attributed to cooking, Méniel (2006, 353, fig. 35) identified burnt pig canines in Grave 1050 at Ludas. Takács (1990–1991, 44–45) explained such marks with singeing, practised when carcass partitioning is aimed at maximising the size of lard attached to the skin. Ethnographically, this method is shown by the vertebral column separated from the animal's sides at the *capitula costae* on either side, rather than splitting the vertebral bodies by hacking (Takács 1990–1991, 46).

The use of iron tools did not only increase the efficiency of butchery. Utilitarian bone and antler tools were soon outcompeted by these artefacts at all discussed sites. The surviving types of bone artefacts barely were manufactured or curated. Choice of raw materials became haphazard, largely relying on the *ad hoc* use of any bone from the food refuse, corresponding to loosely defined "Class II" tools along the manufacturing continuum (Choyke 1997, 66). Antler processing is shown mainly by blanks and cut-off pieces of tine.

Ludányhalászi yielded three artefacts. The best preserved, a large point made from a cattle ulna (Feature 79), corresponds to Type 1/5 in Schibler's (1981, 26) Late Neolithic typology, although the proximal end is missing. It is likely that carefully curated point was abandoned after long use as its handle, the *olecranon*, broke off (Fig. 9.8, specimen c). Similarly, the small chisel (Schibler Type 4/5), made from a caprine metapodium diaphysis (Feature 13) seems to have been used for a long period (Fig. 9.8, specimen b). The third artifact (Feature 53) is an *ad hoc* tool carved from a large ruminant metatarsus, possibly of cattle. These Late Bronze Age bone artefacts are more carefully made than their later, Iron Age counterparts.

The Salgótarján assemblage yielded relatively fewer bone artefacts, most of them similarly poorly made. They included small, evidently improvised points made on caprine bone splinters, although one of the double points (Schibler Type 2/1) may have served as an arrowhead (Fig. 9.8, specimen d). The proximal end of a dog femur was not an artefact itself, but was cut around the diaphysis as if it were used in bead-making or producing some tubular object (Fig. 9.8, specimen a). The Scythian site of Balassagyarmat yielded only one manufactured bone. The fine needle (Feature 3), possibly made from a small ruminant tibia splinter, broke at the level of its eye (Fig. 9.8, specimen e). A goat horn core from Salgótarján was carefully cut to size and two dot-and circle patterns made on its surface may be considered a simple decoration. The entire object is smooth, probably as a result of handling (Fig. 9.9). Following the principle of *pars pro toto*, this object representing a "nomadic" animal species, goat, may represent pastoral tradition.

Of special typochronological interest is a cattle radius tool, worn flat at its anterior-proximal end, recovered from Salgótarján (Fig. 9.10, specimen a). Such objects, commonly occurring at Bronze Age settlements in northern Hungary and Slovakia, have erroneously been described as skates (Alice Choyke, personal communication). This identification is contradicted by the irregular wear patterns on their working surfaces. While the function of the Salgótarján specimen is similarly unknown, it represents a markedly archaic, Late Bronze Age element in the bone artefact inventory of the site, "pre-dating" the overwhelmingly Scythian character of pastoral animal exploitation.

Most Celtic Period tools from Sajópetri were also very simple. Two dozen points and "scrapers" were found, similar to the *ad hoc* tool represented by the spinal process

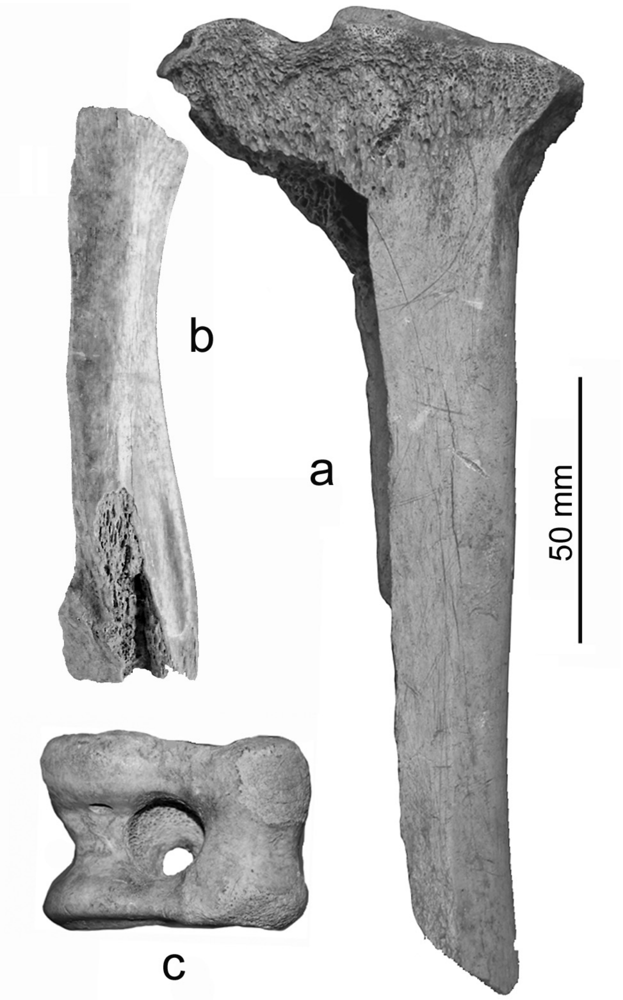

Figure 9.10. Late Bronze Age "Prescythian"/Scythian and Celtic bone tools: a. Late Bronze Age type cattle radius tool with polished surface from Salgótarján; b. Spinal process of a cattle thoracic vertebra, showing high polish along the edge from Sajópetri; c. Red deer astragalus used as a socket for a bow drill utilized for fire making equipment at Sajópetri. Perforated though use.

of a thoracic vertebra from cattle. This piece was used opportunistically and high polish developed on its surface (Fig. 9.10, specimen b). The most interesting utilitarian bone object from this site is a red deer astragalus, part of a bow drill or fire-making kit (Feature A2002/95). Analogies from Greenland and Alaska show that this upper piece of the set, the handhold or socket, was made from the astragalus of a reindeer of very similar size and shape. The natural depression, called the *fossa synovialis, located on the anterior surface,* was not only rounded to a regular hole of 14.2 mm diameter by the rotating motion, but was also perforated by intense use (Fig. 9.10, specimen c). Handling exposed the spongy inside of the bone on its convex surfaces. The top of the neurocranium from a mature stag, with antlers still attached, was recovered from one of two post holes (Feature 95.34) located at either side of a pit dwelling. As shown by a cut mark left by a first attempt, the top was carefully cut off of the calvarium (Fig. 9.6, top). The weathered external surface may be indicative of outdoor display, while the shape is reminiscent of the headgear worn by the Celtic god Cernunnos on the Gundestrup cauldron found in Himmerland (Denmark, 1891) of supposedly Celtic origins, and on a rock carving in Zurla, Val Camonica, Italy (4th c. BC). Discussions concerning the possibly Thracian origins of the Gundestrup Cauldron, however, also point to the universal popularity of the antler/stag motif. Antler has been a complex symbol and a desirable trophy for millennia, its presence therefore cannot be considered culturally idiosyncratic, although the time and place of this curious artefact is certainly thought-provoking.

Discussion and Conclusions

Frontiers have been seen as belts of separation between a polity and its sparsely inhabited hinterland. Modern studies show, however, the importance of understanding how culture contact is interpreted and negotiated between local and expansionist groups (Appadurai 1996, Clifford 1997). Instead of conceptualizing contact areas as zones of distinction, archaeologists have increasingly seen their roles in terms of interaction and hybridization (Van Dommelen 1997, 1998). The comparison of Iron Age assemblages from Northeastern Hungary revealed features of both Scythian and Celtic animal exploitation. It is important that the studied geographical zone was peripheral from the viewpoint of both cultures, such that no homogeneous manifestation of animal related traditions was to be expected.

Following signs of sedentary animal keeping at the Late Bronze Age settlement of Ludányhalászi, the "Scythian" sample from Salgótarján Ipari Park II shows "steppe" elements (such as the dominance of sheep and the consumption of horse meat; Bartosiewicz 2003). Scythian Period food refuse from Balassagyarmat and Jászfelsőszentgyörgy show very similar proportions between domesticates, with somewhat more pig in the hilly region and more horse in the plain. The early occurrence of domestic hen is remarkable at both sites, a clear, qualitative sign of cultural influx from southeast.

Hunting was rather unimportant. Two interpretations of pastoral attitudes towards the "wild" may be contrasted here: some herders may have been reluctant hunters, killing game opportunistically, out of necessity. The other possibility more or less corresponds to the stereotype of warlike "nomads", engaged in hunting as a sport or even military exercise. While the latter image has been perpetuated widely by Scythian artwork, archaeozoological evidence supporting this rich imagery is missing. This is what makes even the very few bones from large game, especially those of bison, aurochs and brown bear important at the sites under discussion here.

Perhaps by coincidence, the same fascination with the wild happens to be better reflected in the animal bone assemblage from Sajópetri. To some extent this may be attributed to Celtic tradition known from Western Hungary,

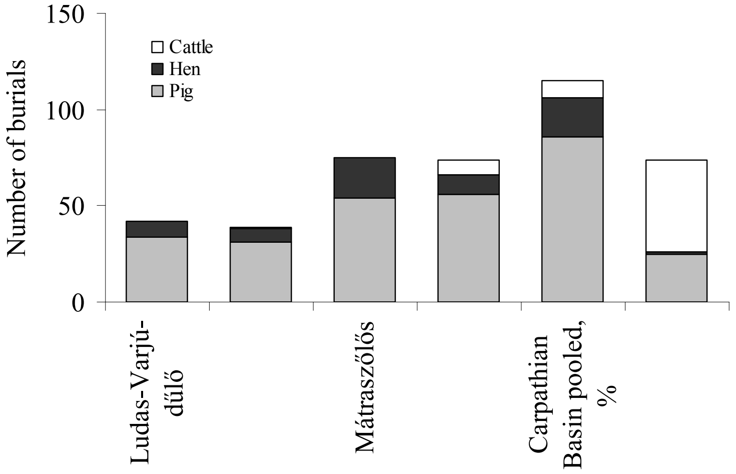

Figure 9.11. The contribution of main animal species to Celtic burials in Northern Hungary/Slovakia.

although it is a lot less pronounced. This meat diet is consonant with the 'Celtic' style of several archaeological artefacts recovered here. A relatively high consumption of pork as well as hunting and fowling are distinctive characteristics of animal exploitation at Sajópetri. However, neither of these sources of meat seem as important as at some Celtic sites in Transdanubia: in fact, this material is not strikingly different from the others, representing the "Prescythian"/Scythian Period in the area (see Fig. 9.2). These "Celtic" features, however, look vague in light of the animal offerings identified at the nearby cemetery of Ludas (Méniel 2006), that reflect far-reaching, classical Celtic mortuary rituals with an overwhelming dominance of pig remains. Fig. 9.11 shows two major Celtic cemeteries from Northern Hungary and one from Slovakia (Palárikovo), as well as a percentual summary of 326 graves from 50 smaller cemeteries (Vörös 1994, 86; note that percentages add up to more than 100% in this graph, owing to overlaps between animal species in several graves). Evidently, this clear pattern is far from what is reflected by the refuse bone material from Sajópetri. In addition to the well known role of pigs in Celtic mythology, domestic hen, a relatively new domestic animal seems to have been a preferred species in mortuary rituals.

The ethnic identity of inhabitants at Sajópetri may have differed from those interred at the Ludas cemetery. Nevertheless, the relative importance of pork and evidence of deer hunting distinguish it from earlier, "Prescythian"/Scythian Iron Age settlements in this frontier zone, consonant with Celtic influx in the region. In summary:

- The remains of domesticates dominate at all sites in the studied region.
- The Late Bronze Age assemblage from Ludányhalászi shows the least external influence (*i.e.*, seems most localised).
- The Salgótarján assemblage contains typical "steppe" elements (high proportion of bones from caprines and horse).
- Early occurrences of domestic hen at the Scythian site of Balassagyarmat and a previous discovery at Jászfelsőszentgyörgy are of great cultural significance.
- Sajópetri revealed relatively numerous wild animal bones, including a worked stag skull fragment, possibly related to Celtic spiritual life. While important, the contribution of pork to the diet at this settlement does not reflect the massive dominance of pig remains in Celtic cemeteries in the area.
- Probably in part owing to the availability of metal implements, bone manufacturing seems to be limited to extremes: the opportunistic use of *ad hoc* tools, and the production of a small minority of more sophisticated artefacts.

The ethnic composition of inhabitants in the study area is unclear. This frontier thus may be characterized by classical infiltrations of settlers into a sparsely populated hinterland (Wynman and Kroeber 1957). Presuming unidirectional population movements, in this case, would not only represent an unjustified core-centred view far away from both the Scythian and Celtic homelands. It would also contradict the dynamic overlap between archaeozoological evidence of influences from the southeast (*e.g.*, early domestic hen reaching into the Northern Mountains) and the west (*e.g.*, the increasing importance of pig in the Tisza Valley).

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PART II

ZOOARCHAEOLOGY AND COLONIALISM

editors
Pam J. Crabtree and Douglas Campana

10. Archaeozoology and Colonialism: An Introduction

Douglas V. Campana

The discipline of anthropology developed out of the colonial encounter. While many Anglo-American historical archaeologists have focused their research on the impact of European colonialism over the past 500 years, anthropological archaeology has the potential to examine a wider range of colonial situations. Archaeozoology has a critical role to play in the archaeological study of colonialism, since colonial encounters can lead to changes in both traditional foodways and political economy.

Keywords: archaeozoology, colonialism, foodways, political economy

In an introduction to *Historical Archaeology in Global Perspective* (Falk 1991), a volume that grew out of the Smithsonian's strategic planning for the 500th anniversary of Columbus's voyages, the late James Deetz suggested that historical archaeology should be defined as "the archaeology of the spread of European societies worldwide, beginning in the fifteenth century, and their subsequent development and impact on native peoples in all parts of the world" (Deetz 1991, 1). While many contemporary scholars may view this definition as eurocentric, Deetz's definition does point out the important role that colonialism plays in the archaeology of the modern world (see, for example, Orser 1996). In fact, the whole discipline of anthropology grew out of the colonial encounter, as European travelers and administrators (and later scholars) first came in contact with peoples whose languages, cultures, and ways of life were radically different from anything that they had known in Europe and the Mediterranean regions.

While Deetz and other Anglo-American historical archaeologists have focused on the impact of European colonialism in the past 500 years, colonialism and the colonial encounter have a much longer history, dating back as far as the Uruk colonies in northern Mesopotamia in the 4th millennium B.C.E. As Gosden (2004, 6) notes: "Archaeology has a special role to play in the study of colonialism. Archaeology is the only discipline that can cover the full temporal range of colonial forms over the millennia." In addition, ancient colonial societies served as models for European colonial administrations in the late 19th and early 20th centuries. For example, the Roman colonization of Britain in the 1st century C.E. served as a model for the British Empire in the pre-World War II period. The concept of "romanization" or the gradual, top-down assimilation of Roman material culture, technology, and ideology not only dominated the archaeological and historical study of Roman Britain for most of the 20th century, it also influenced the administration of British colonies in India and elsewhere.

Today, archaeologists recognize that colonialism is a complex process involving the homelands, the colonists, and the host communities. As Gil Stein (2005, 13) notes: "We can no longer assume that colonies dominate the preexisting indigenous polities among whom they are founded; nor can we assume that colonies directly reflect the interests of their colonial homelands." Historically, colonists and native populations have interacted in a variety of different ways, and archaeology allows us to explore this variety by bringing us "face to face with the material past" (Deetz 1991, 6). In particular, archaeology allows us to begin to reconstruct the experience of colonized people, people who "tend of be 'invisible' or 'voiceless', only becoming part of history when their rulers decide to write about them" (Given 2004, 3).

Archaeozoology is a particularly important tool for studying the colonial encounter because faunal analysis is the study of the ways in which past human populations have hunted and herded animals and the ways in which these animals have been used for food and other primary and secondary products. At a very basic level, food and culinary traditions are some of the most important ways in which ethnicity is expressed. As zooarchaeologists we want to understand whether and how natives' and colonists' diets changed as a result of the colonial encounter. To what extent did colonists make use of native animals, cooking traditions, and other foodstuffs? How did native populations make use of the animals that the colonists brought with them? How did the presence of a colonial population affect indigenous patterns of animal husbandry, hunting, and feasting? Did the native and colonial traditions of hunting, animal husbandry, and cuisine combine in new ways to form a "creole" culture?

Zooarchaeology can also be used to address fundamental questions of political economy that arise from the colonial encounter. Given (2004, 5) argues that "The struggle between the colonized and their rulers over agricultural surplus lies at the heart of the colonial experience." Faunal data can be used to examine this assertion. For example, how did the European colonization of the Americas or the Roman colonization of Europe change native systems of animal production? Is there evidence for increasing specialization in animal procurement? Were the colonists supplied with special foodstuffs? What role did animal products play in native and colonial systems of taxation? All these questions can be addressed by zooarchaeologists using standard methods such as species frequencies, ageing data, bone measurements, and butchery data.

Some of the contributors to this section of the volume examine how the choice of foodways contributed the maintenance of ethnic identities; others look at how colonized peoples adapted (or failed to adapt) to the new domesticates available to them and how the culture of colonized peoples changed in reaction to the colonial encounter.

The ICAZ meetings in Mexico City provided a unique opportunity to examine the contributions that zooarchaeology can make to the study of colonialism. One of the goals of these meetings was to showcase the important role that zooarchaeology can play in the archaeology of the Americas, and especially in the archaeology of Latin America. This volume includes several papers by scholars who are studying the archaeozoology of colonialism in the Americas. In addition, the ICAZ membership includes many scholars who work in Europe, including a number who work on Roman sites and who study the archaezoology of Roman colonialism. This volume provides an opportunity to bring these two groups of scholars together. The result, we hope, will be a comparative archaeozoology of colonialism, one that will be of interest to a broad range of scholars in both the Eastern and the Western Hemispheres.

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11. Craving for Hunger: A Zooarchaeological Study at the Edge of the Spanish Empire

Mariana E. De Nigris, Paula S. Palombo, and María X. Senatore

*This paper presents the first zooarchaeological results from Nombre de Jesús village. The village was established in Cabo Vírgenes (Santa Cruz, Argentina) at the end of the sixteenth century as part of the Spanish fortification of the Magellan Strait. Over 300 people disembarked, including soldiers, settlers, women, and children. From the beginning, living conditions were extremely hard for the villagers. Food scarcity, bad weather conditions, and hostility from local populations were the main problems the colonists faced. Written documents point out that every possible food resource present in the area was used, yet almost all the villagers had died within three years. According to the bone assemblages analyzed, a great diversity of local species was consumed. Several bird taxa, mammals like guanaco (*Lama guanicoe*), seals, and various species of shellfish were the principal targets of this population. Although the colonists used a diverse range of species, the faunal samples do not show clear evidence of intensive processing, and several resources, like marrow, were unused. The strategy followed by Spanish villagers, in addition to their previous nutritional deficiencies, might have led them to starvation.*

Keywords: Spanish colonialism, Southern Patagonia, isolation, scarcity, nourishment deficiencies

The Sad End of a Big Venture

This paper presents the first zooarchaeological results from Nombre de Jesús village, established in Cabo Vírgenes (Santa Cruz, Argentina, Figure 11.1). The village was founded by Pedro Sarmiento de Gamboa in 1584 and was the ephemeral result of an ambitious fortification plan designed to protect the Magellan Strait. Along with Rey don Felipe village, it constitutes the first attempt to colonize the extreme south of Patagonia.

The project was launched during Phillip II's reign and included the foundation of two fortifications, one on each shore of the Strait, in order to control sea traffic to the Pacific Ocean and to defend the Spanish ports which had been recently besieged by Sir Francis Drake (Destefani 1976; Nussio Díaz 2001; Oyarzun Inarra 1976; Pastells 1920; Sarabia Viejo 1988).

The tragic history of these two villages is only barely known through Sarmiento de Gamboa's letters and reports (Rosenblat 1950) and through the testimonies of the last survivor, Tomé Hernández, who was rescued accidentally by an English ship in 1587 (Barros 1978; Rosenblat 1950).

From the beginning the journey was dreadful. On December 9th of 1581 the fleet, composed of 23 ships, weighed anchor from Sanlúcar de Barrameda in Spain. During the trip there were numerous shipwrecks, and many people deserted in different ports on the South American shore due to the difficult conditions experienced. Numerous provisions were sold or stolen and several travelers died during the appalling voyage (Martinic 1983; Nussio Díaz 2001; Pastells 1920; Sarabia Viejo 1988).

In 1584 only two ships and about 340 people – including soldiers, priests, settlers, women, and children – managed to arrive at the Strait and disembarked at the Atlantic shore, nowadays known as Cabo Vírgenes. In a place called Valle de las Fuentes, the first village – Nombre de Jesus – was founded because of the availability of water from springs (Rosenblat 1950; Sarabia Viejo 1988).

One month later, a group of 94 soldiers led by Sarmiento de Gamboa began a trip on foot to the west in order to establish a second town. After a hard trip of over 200 km they founded Rey Don Felipe in present-day Chile (Martinic 1983; Rosenblat 1950; Sarabia Viejo 1988).

Sarmiento de Gamboa remained there until May, 1584, when he left the Strait for Rio de Janeiro in order to request help for settlers and soldiers. Unfortunately, he received no response from the Spanish Crown, so he decided to set out for Spain, but he was taken prisoner by a British ship and sent to England (Pastells 1920; Rosenblat 1950; Sarabia Viejo 1988).

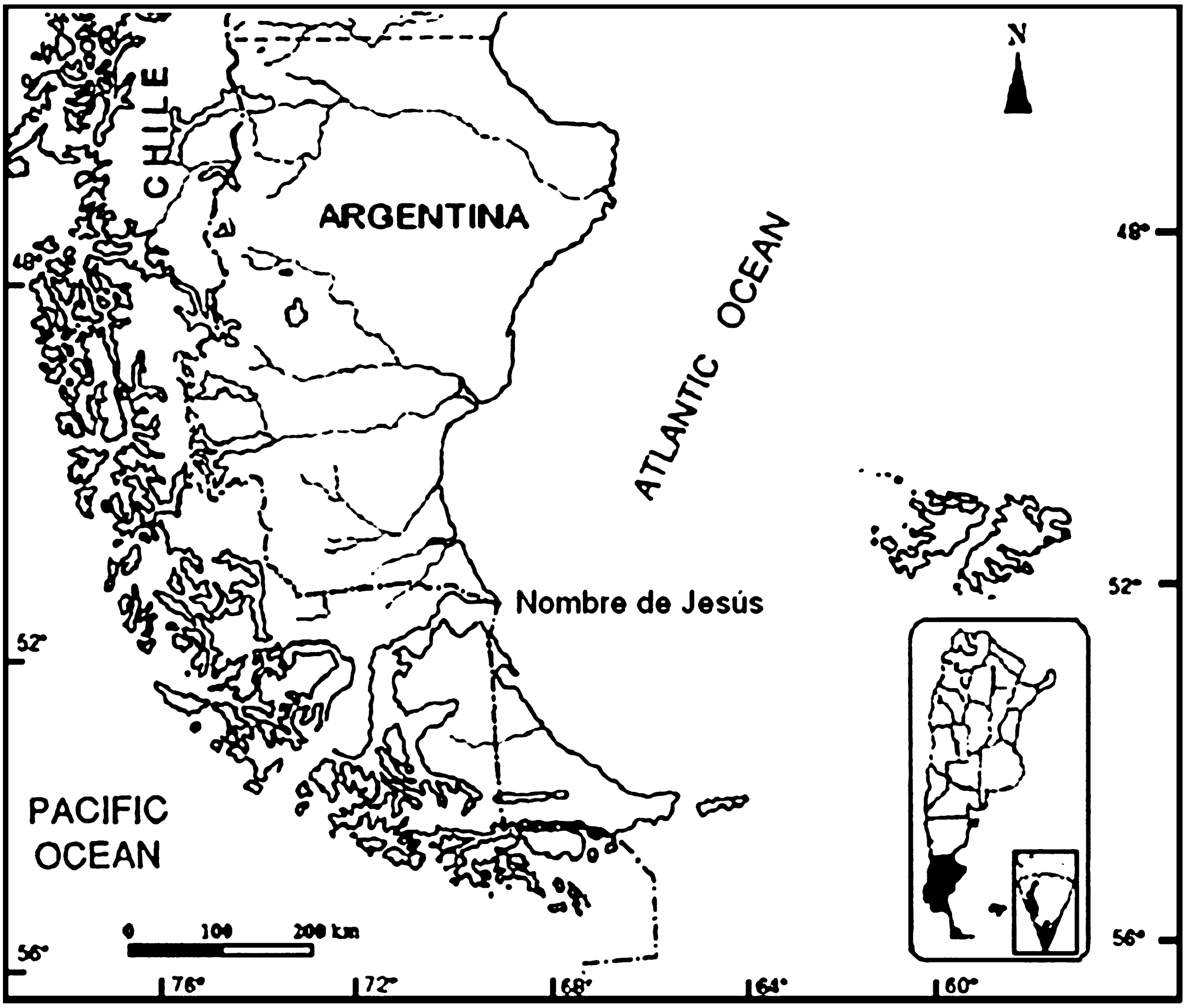

Figure 11.1. Location of Nombre de Jesús village.

After a few years he was released, but while he was returning to Spain he was again imprisoned by the French until 1590 (Rosenblat 1950). As a result, the settlers established by Sarmiento were abandoned to their fate by the Spanish Crown. The abandonment experienced by the colonizers can also be related to the impact of the defeat of the Spanish "Grande y Felicísima Armada" by the British in 1588 (Elliott 2001).

Three years after Sarmiento's departure, in 1587, the pirate Sir Thomas Cavendish landed at Rey don Felipe. He found only the ruins of the settlement and hardly any people alive. He renamed the place as Port Famine, a name that is still in use (Rosenblat 1950).

Thus, the project of fortifying the Magellan Strait became one of the most tragic chronicles in the Spanish colonization of America. The hard contingencies of the trip, in addition to extremely rough weather conditions found in the Strait, food scarcity, isolation, and hostility from local populations were the main problems villagers had to face in order to survive (Martinic 1978).

How to Survive in an Unknown Environment

Even though the Spanish Crown included provisions – such as sea biscuit, flour, wine, oil, vinegar, bacon, salted meat, tuna fish, cheese, rice, beans, and corn – to ensure the success of the venture, the analysis of documentary evidence shows that in the new towns there were few European provisions available:

> …porque de los navíos no se había aún sacado sino siete u ocho medias pipas de vinagre pestilencial por vino, y dos medias pipas de atún, y bizcocho para ocho días muy escasamente, y la ración acortada y retrasada más de la mitad, porque, habiéndose da dar libra y media de bizcocho a cada uno, según la tasa de los jueces y oficiales de la Contratación de Sevilla, no se daba sino once onzas y medio cuartillo de vinagre; el atún nadie lo quería, por estar perdido; media docena de tocinos y como dos docenas de quesos. Esto es lo que se había sacado, y Pedro Sarmiento, viendo la incertidumbre de la desembarcada de los bastimentos, guardaba esto, para con ello ir la tierra adentro a buscar otro (Rosenblat 1950, 20–21).

In addition, there are very few references related to domestic animals in the records and these are principally connected to the presence of Old World livestock – goats, sheep, cattle – and dogs:

> …Y Pedro Sarmiento embarcó los pobladores y algunas novillas y cabras y ovejas vivas para cría, y plantas de frutales y viñas y hortalizas para plantar y sembrar, con semillas de todas suertes (Rosenblat 1950, 128).
>
> …Es cosa notable que Pedro Sarmiento comenzado a caminar, el ganado que había traído y los perros tomaron la delantera (Rosenblat 1950,143).

Moreover, documents describe several attempts made to introduce Old World crops but apparently without success:

> …Rompíase la tierra para sembrar, por apercibirse de todo para el invierno, que estaba ya presente y la gente temerosa del rigor del frío y falta de comida, como gente nueva en estas cosas y semejantes trabajos. (Rosenblat 1950, 34).

In fact, the crops brought to this new land were not really appropriate for the climate of the Straits of Magellan. They included beans, turnips, grapevines, quinces, and several types of garden products such as lettuce, radishes, and cabbages. The selection of products to be grown clearly shows the Spanish colonists' ignorance about conditions in the new environment (Benites 2004).

Consequently, because of the hazards of shipping and the environmental constraints, all Spanish colonists were unable to maintain many resources included in their traditional subsistence economy, and they were confronted with new and unfamiliar resources (Reitz and Scarry 1985). Many other Spanish colonies in America experienced this situation, but the Magellan Strait was located at the very edge of the Spanish Empire, and there was an absolute lack of communication with other colonies or the Iberian Peninsula.

Written documents point out that, due to scarcity of food, every edible resource present at the area was consumed, including terrestrial mammals, sea mammals, birds, shellfish, fishes, eggs, wild fruits, and roots:

> …y que la gente buscase comida por la tierra, de raíces y frutillas, marisco y caza, hasta buscar otro mejor remedio. (Rosenblat 1950, 31).
>
> …y muchos rastros de animales que no conocimos, muchos avestruces grandes, y hallábanse algunos güevos dellos, que son de buen sabor, y muchas uvas negras de espino, que nos recreaban y satisfacían a la necesidad y hambre que se pasaba, porque se sacó poca comida, y con el trabajo del camino algunos desordenados se la comieron en dos días, y ya no tenían qué comer sino uvas y marisco de mejillones, cuando los hallaban, y apio, algunos gatos cervales de hermosas pieles para aforros, de los cuales matamos uno con perros…(Rosenblat 1950, 37–38).

But in spite of these efforts almost all the villagers were dead in three years' time. There are constant references to hunger in documentary sources:

> …Allí, las más veces, se hallaba tanto marisco de esto que, toda la noche no hacía sino comer, con que se olvidaban de la falta de comida y hambre que teníamos, que ya se iba sintiendo mucho, mientras más más, y aumentábaseles con pensar que aquello no había de tener fin…(Rosenblat 1950, 39).

Environmental and Archaeological Background

Nowadays, the dominant plant species in the Cabo Vírgenes area are gramineous grasses with patches of gramineous-shrubby steppe (León *et al*. 1998). The soil is sandy and lightly acidic with abundant organic content. It also includes carbonates (Borrelli *et al*. 1987). The climate is cold with annual average temperatures between 5º and 6º C and rainfall is usually from 200 to 400 mm yearly. The area provides favorable conditions for the development of various species of fauna, including several species of nested birds (Cruz 2003).

Although there is still debate among researchers, paleo-environmental data indicate that there was a period of cooling in the 16th century – the Little Ice Age – that took place after a warmer era (Glaser *et al*. 2002; Mann 2002). As a result, average temperatures may have decreased in the Magellan Strait, and climatic changes might have transformed the area into an even more hostile landscape.

When analyzing Spanish colonists' subsistence two factors should take into account. First, the settlers were completely ignorant of local resources, and secondly, high latitudes impose constraints on human existence due to the scarcity of carbohydrates. A higher caloric intake is necessary to survive in these environments, because basal metabolic rate rises upon sustained exposure to cold temperatures (Cachel 2000; Jochim 1976; Speth 1983, 1988; Stiner 1994).

Materials and Methods

The results presented here came from the first systematic excavations carried out at Nombre de Jesús. The excavation covers an area of 19.5 m^2, and three distinct layers were differentiated during archaeological work. The analysis of contextual evidence plus the presence of 5 human skeletons point out that the excavated area corresponds to the village church (Senatore *et al*. 2007).

Although all three layers could be ascribed to Nombre de Jesús village, during the zooarchaeological analysis we examined each one separately because we believe it is the most appropriate way to understand the depositional and taphonomic history of the site.

A brief description of these layers is presented here (for a more a detailed description see Senatore *et al*. 2007). The uppermost layer is characterized by the presence of 16th-century Spanish remains. The analyzed samples, basically composed of pottery sherds and faunal remains, show signs of erosion and weathering as well as root marks. This layer produced the largest sample of faunal remains, but, as we will see later on, it is possible that many of them might have been added by the action of post-depositional processes.

Underneath, layer 2 is completely different. The archaeological remains are scarce but well preserved. Several structures have been identified; they are formed by the alignment of raw adobe bricks that rest on the base of this layer. This stratigraphic level may be associated with the actual Spanish settlement of the site. Finally, layer 3 contains human burials and is considered a high integrity context.

Results

The bone assemblages reveal a great diversity of local species. Several bird taxa, mammals, and various species of shellfish were the principal targets of the Spanish population.

Birds dominate all the analyzed assemblages (Table 11.1). Remains of birds which were heavily fragmented and could not be identified to species were most numerous, followed by those of seabirds such as seagulls (*Larus* sp.), cormorants (*Phalacrocorax* sp.) and albatrosses (*Diomedea* sp.). Remains of aquatic birds are also present in the assemblages. Birds in this category include ducks (Anatidae), as well as herons (*Nycticorax* sp.) and geese (*Chloephaga* sp.). Specimens of lesser rhea, a large flightless bird from southern South America, were also identified.

Despite the importance of birds in the samples, it is not clear if all of the birds identified were actually eaten. Seagulls, for example, were found only in the uppermost level and show no traces of butchery. So it is possible that their presence at the site is a result of post-depositional processes.

In relation to mammals, the guanaco dominates all the samples. The processing marks present on the guanaco bones confirm that guanacos were consumed by the colonists. In addition, the examination of the sediments from the pelvic cavities of two human skeletons reveals the presence of parasites that are probably the consequence of guanaco consumption (Fugassa y Guichón 2006).

Remains of unidentified small, medium, and large mammals are also important. The vast majority of these unidentified mammal bones are cranial, ribs, vertebrae, and long bone shaft fragments. In contrast, very few fragments of domestic animals were identified. These include cattle (*Bos taurus*), sheep/goat (*Capra/Ovis spp.*), pig (*Sus scrofa*), and probably dog (*Canis familiaris*). Nevertheless, the Spanish origin for all these species is not well established.

The sheep/goat phalanx – identified from the uppermost level – shows clear evidence of carnivore damage and no butchery marks (Figure 11.2). As the area is today used for sheep grazing, its presence in the archaeological site is probably the result of carnivore activity. Moreover, the cattle bones, also recovered from the uppermost level, present clear signs of weathering but no evidence for butchery.

Fragments of pig canine were recovered from the second level of the site – a high integrity deposit. Root marks are visible on the canine, and we believe this canine dates to the Spanish colonization period (Figure 11.3).

The proximal tibia of a canid, preliminarily identified

FAUNAL CATEGORY	LAYER 1	LAYER 2	LAYER 3	TOTAL AREA 1
Unidentified bird	174	33	3	210
Anatidae	2	-	-	2
Geese (*Chloephaga* sp.)	2	-	-	2
Seagull (*Larus* sp.)	43	-	-	43
Cormorant (*Phalacrocorax* sp.)	25	12	-	37
Black-browed-albatross (*Diomedea melanophris*)	1	-	-	1
Heron (Ardeidae)	1	-	-	1
Heron (*Nycticorax nycticorax*)	8	-		8
Lesser rhea (rehidae)	1	-	2	3
Unidentified mammal	1	6		7
Small mammal	3	3	-	6
Medium mammal	5	5	-	10
Large mammal	37	27	-	64
Pig (*Sus scrofa*)	-	2	-	2
Goat or sheep (Capra/ovis spp.)	1	-	-	1
Cow (*Bos taurus*)	2	-	-	2
Carnivore	1*	2	-	3
Felidae *(Felis* sp.)	1	-	-	1
Artiodactyl	4	3	1	8
Guanaco (*Lama guanicoe*)	83	17	5	105
Rodentia	4	18	189	211
Unidentified fish	2	3	-	5
Total identified bone	402	130	200	732
Unidentified bone	207	74	29	310
N Total	609	204	229	1042
*Dog? (*Canis familiaris*)				

Table 11.1. Taxonomic representation at Nombre de Jesús (NISP values).

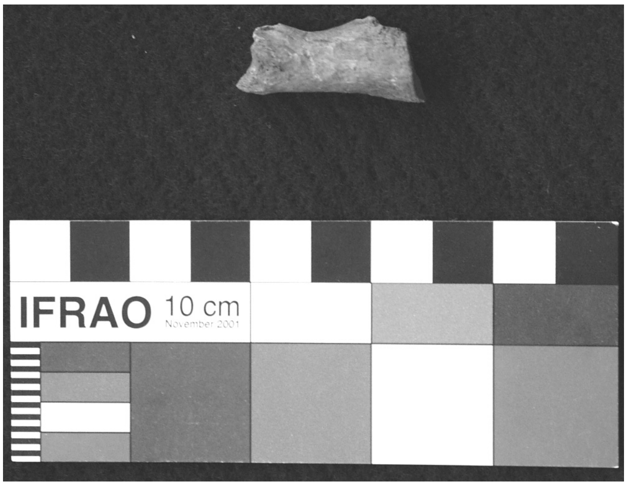
Figure 11.2. Sheep/goat phalanx with carnivore marks.

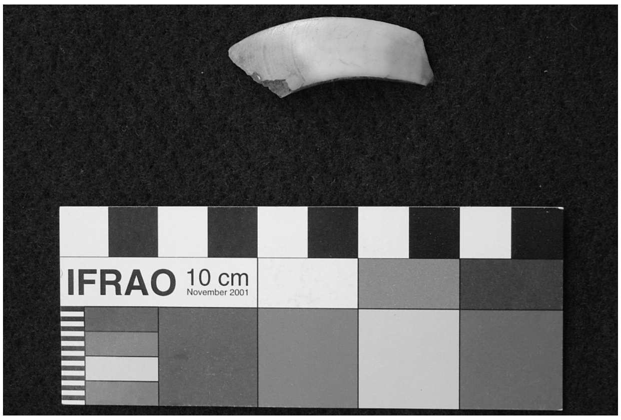
Figure 11.3. Pig canine with root marks.

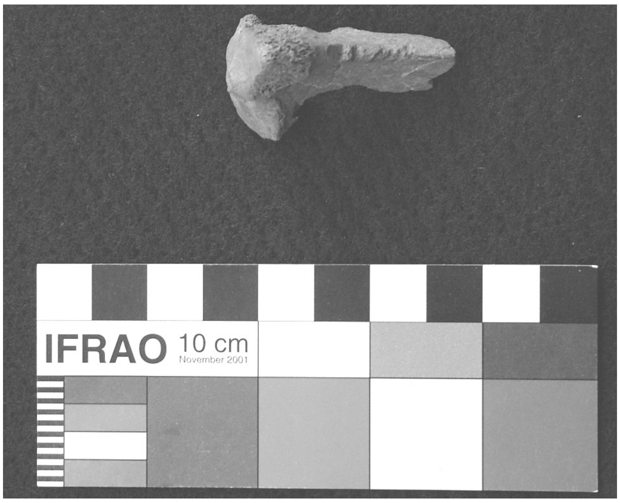
Figure 11.4. Proximal tibia of a canid (dog?) with chopping marks.

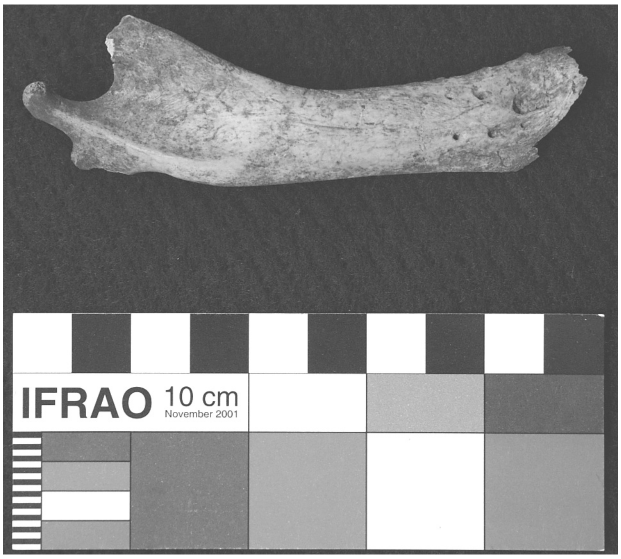
Figure 11.5. Mandible of seal with cut and root marks.

as a dog, shows clear chop marks (*sensu* White 1992) indicating consumption (Figure 11.4). In relation to this it is interesting to observe that during the 16th century dog meat was actually eaten in certain regions of Spain (Reitz and Scarry 1985).

As we have already mentioned, guanacos were the most numerous of the wild terrestrial mammals in all the analyzed assemblages. When all three layers are considered together, we found that all the skeletal parts of the guanaco are present, with the exception of the innominate and scapula. There is no correlation with bone density (r_s= -0.19 p< .01) indicating that the body part distribution is not a result of density mediated processes.

No sea mammal bones were recovered from the main excavations. However, a test pit in another area of the site produced seal bones (*Otaria flavensis*). One of them, a mandible, exhibited cutmarks, indicating that this species was also consumed (Figure 11.5).

Small numbers of fish specimens were identified. All are vertebrae. As they are not very diagnostic, we were not able to identify them to species at present. Documents report the consumption of fish, but since the recovered samples are so small, further studies will be required to determine whether they were stomach contents of the birds that were hunted.

It is important to note that all of the analyzed assemblages also contained a variety of edible shellfish, but the identification and the quantification of these remains is not presented here.

Rodents are present in all assemblages, but they predominate in layer three (the lowermost layer), in the same context as human skeletons. The element distribution suggests that these animals were casual inclusions in the deposits.

Despite the diversity of species exploited, the bone samples do not show clear evidence of intensive processing and several resources, like marrow, appear to remain unused.

Very few processing and consumption marks were identified during the analysis. Only cut marks and chop marks were distinguished. The results of the analysis of the butchery marks from all three levels together are shown in Table 11.2. Butchery marks are present on bird and mammal remains. Cormorants have the highest frequency

FAUNAL CATEGORY	NISP	CUT MARKS	CHOP MARKS	ROOT MARKS	CARNIVORE GNAWING	MODERN MARKS	RODENT MARKS
Unidentified bird	210	2 (0.9%)	-	18(8.6%)	2(0.9%)	2(0.9%)	-
Anatidae	2	-	-	-	-	1(50.0%)	-
Geese (*Chloephaga* sp.)	2	-	-	1 (50%)	-	-	-
Seagull (*Larus* sp.)	43	-	-	1 (2.3%)	-	-	-
Cormorant (*Phalacrocorax*)	37	12(32.4%)	-	8(48.6%)	1(2.7%)	-	1(2.7%)
Black-browed-albatross	1	-	-	1 (100%)	-	-	-
Heron (Ardeidae)	1	-	-	-	-	-	-
Heron (*Nycticorax*)	8	-	-	-	-	-	1(12.5%)
Lesser rhea (rehidae)	3	-	-	-	-	-	1(33.3%)
Unidentified mammal	7	-	-	1(14.3%)	-	-	-
Small mammal	6	-	-	-	-	-	-
Medium mammal	10	-	-	3(30%)	1(10%)	1(10%)	-
Large mammal	64	4 (6.2%)	1(1.6%)	8(12.5%)	1(1.6%)	1 (1.6%)	-
Pig (*Sus scrofa*)	2	-	-	1 (50%)	-	-	-
Goat or sheep (Capra/Ovis)	1	-	-	-	1 (100%)	-	-
Cow (Bos taurus)	2	-	-	-	-	-	-
Carnivore	3	-	1(33.3%)	-	1(33.3%)		-
Felidae *(Felis* sp.)	1	-	-	-	-	-	-
Artiodactyl	8	-	-	-	-	-	-
Guanaco (*Lama guanicoe*)	105	5(4.8%)	1(0.9%)	20 (19%)	9 (8.6%)	3 (2.9%)	1(0.9%)
Rodentia	211	-	-	-	-	-	-
Unidentified fish	5	-	-	-	-	-	-
Total	732	23 (3.1%)	3(0.4%)	71(9.7%)	17(2.3%)	9 (1.2%)	4(1.8%)

Table 11.2. Bone modification at Nombre de Jesús.

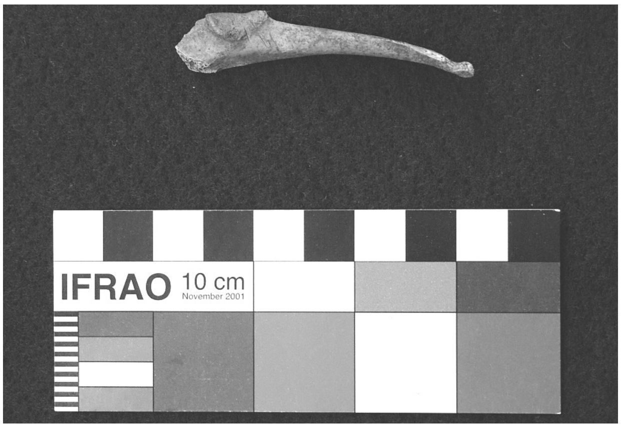

Figure 11.6. Cormorant coracoid with cutmaks.

of cut marks (Figure 11.6), followed by unidentified birds. Among the mammals, the cut marks predominate in large mammals and guanacos. Nevertheless, these frequencies are very low, especially if we compare them with hunter-gatherer consumption contexts. As we have noted, chop marks are present on canid bones, followed by guanacos and large mammals.

In terms of non-cultural modifications, root marks are most common both on bird and mammal bones. Marks produced by carnivores come second, followed by rodent modifications. Carnivore marks are common on guanaco bones, but these frequencies are in full agreement with experimental study results (*e.g.* Blumenschine 1988, 1995; Blumenschine and Marean 1993) for a secondary access to bones, after human consumption. The results of the analysis showed that marks are not homogeneously distributed on carcass. On the contrary, they are principally placed on vertebrae, long bone joints, and phalanges, all parts which are rich in fat and seem to remain attractive to carnivores after non-exhaustive human consumption.

Guanaco muscle meat contains less than 1% fat (Mengoni Goñalons 1996). Therefore, most of the lipids are concentrated in the marrow contained in long bones, phalanges, and mandibles. Soft cranial tissues, such as the brain, also contain relatively high fat levels and are quite stable through the year due to their neurological function (Stiner 1994).

Since guanaco muscle tissue has limited amounts of fats, the lipids contained in the marrow cavity of mandibles, long bones, calcaneum and phalanges together with the organs included in the head became crucial resources. However, there is no clear evidence of marrow exploitation at Nombre de Jesús, such as the presence of impact notches, percussion marks, and so on.

Even though birds, and specially seabirds, constituted an important source of animal protein, fat, and linoleic acid, this might be insufficient in very extreme habitats. Sea mammals, like seals, are very important for fats. Recent studies have shown that they provide more fat than terrestrial mammals (Schiavini 1993). However, they seem to have been rarely exploited by Spanish villagers. It is interesting to notice that hunter-gatherer populations that inhabited the same area of Cabo Vírgenes used to exploit cormorants and seals principally due to their predictability and annual availability (L'Heureux and Franco 2002).

Final considerations

The analysis of the Nombre de Jesús bone assemblages leads to several general conclusions. The study has shown the almost complete absence of domestic animals at Nombre de Jesús. Only the pig was undoubtedly brought by the Spanish. If the identification of the canid as dog can be confirmed, we may also conclude that dogs were present in the Spanish community.

Birds were intensely exploited and must have been important in terms of fats and linoleic acid. It is significant that the use of wild birds by Spaniards mirrors the use of these resources by the hunters and gatherers of the Magellan Strait due to their predictability on year round basis (Berberena *et al.* 2004; L'Heureux and Franco 2002).

Guanaco was also exploited, but when compared with its utilization by hunter-gatherers, it was not exhaustively used by the Spanish colonists. Marrow, in many cases, seems to have gone unused. And, at least to this point, very few sea mammals seem to have been consumed.

As we have noted above, very high latitudes impose constraints on human existence because of the scarcity of edible plants that could supply an alternative source of calories. A higher caloric intake is necessary to survive in these environments (Cachel 2000; Jochim 1976; Speth 1983, 1988; Stiner 1994). This might have been the case of Nombre de Jesús since villagers had very few European provisions, the attempts to cultivate Old World crops had disappointing results, and very few head of livestock had survived the trip to the Magellan Straits. Due to this scarcity it appears that the strategy followed by the Spanish villagers, which was not focused on the exploitation of wild animal fat, added to their previous nutritional deficiencies and might have provoked starvation. The studies carried out on human skeletal remains also show strong signs of malnutrition (Senatore *et al.* 2007).

Of course it is important to note that a complete analysis of the Spanish settlers' subsistence should include a consideration of vegetal remains, but so far no botanical samples have been retrieved. We hope in the near future we will be able to recover plant evidence to complete the picture of the diet of the Spanish settlers.

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12. Zooarchaeology in the Spanish Borderlands of the American Southwest: Challenges and Opportunities

Diane Gifford-Gonzalez

Over the last thirty years, zooarchaeological studies of animal use in the pre-contact Southwest have become increasingly sophisticated. They have expanded from species lists to exploring ecological relations over time, inter-ethnic symbioses, social dimensions of predation and provisioning, and roles of animal species in social rituals and ideological change. Much less is known of the time span immediately after the Spanish occupation of the region. In comparison with studies of the Spanish colonial Southeast, Southwestern historic zooarchaeology, and historical archaeology in general, are undeveloped, for a variety of historical and institutional reasons. However, studies carried out in the last decade open prospects for detailing indigenous and colonist animal use during this period. This essay reviews some of the salient challenges and opportunities of colonial zooarchaeology in the Southwest.

Keywords: Southwest, historic, zooarchaeology, colonialism

Introduction

This essay comprises the reflections of a participant-observer who started working on historic zooarchaeological materials only recently, about how historical zooarchaeology differs from and is similar to prehistoric zooarchaeology. These observations are qualified by a necessary humbleness stemming from the fact that I have only been working in the U.S. Southwest at all over the last two decades, as well as by the fact that I was not trained as an Americanist. However, sometimes an innocent – if not ignorant – eye can see what others working within a paradigm may not, and I hope my observations will be taken in the constructive spirit they are offered.

A central challenge and opportunity in the zooarchaeology of the colonial Southwest comes from the fact that most practicing historical faunal analysts in the Greater Southwest were trained as prehistoric archaeologists, rather than as historic archaeologists. We are accustomed to using certain theoretical and methodological touchstones to guide our research and the interpretations. Some of these are purely derived from zooarchaeological theory and method, but others are among the broader working assumptions (and received wisdom) of prehistoric archaeology. Most of us lack skills in historiography, and we may not begin our research armed with a deep acquaintance with debates among historical researchers in our region, or with theoretical or methodological debates in historical archaeology as a whole. Moreover, even with the relatively fine-grained control of time enabled in many Southwestern sites by dendrochronology, researchers may be unaccustomed to the fine-scaled temporal "resolution" in our historical samples. Few of us have been trained to think on a generational or intra-generational scale, which is often what we are dealing with in our faunal samples, especially from the early colonial period.

Some zooarchaeologists with long careers in prehistoric research, such as myself, have welcomed the chance to work within richer textual and archaeological contexts that accumulated over such brief and better-documented temporal scales. The historic context offers us the chance to learn new approaches in collaboration with persons skilled in working with textual sources. At best, our deficiencies may be balanced by our strengths in wringing information from detailed, taphonomically precise analyses of faunal materials. The emerging cohort of younger zooarchaeologists trained in historic archaeological studies are in many ways better prepared to work as historical zooarchaeologists, with broader acquaintance with historical archaeology in general and with historiography.

The following sections survey the challenges and opportunities of zooarchaeology in the Spanish Borderlands of what is now the U.S. Southwest and adjacent parts

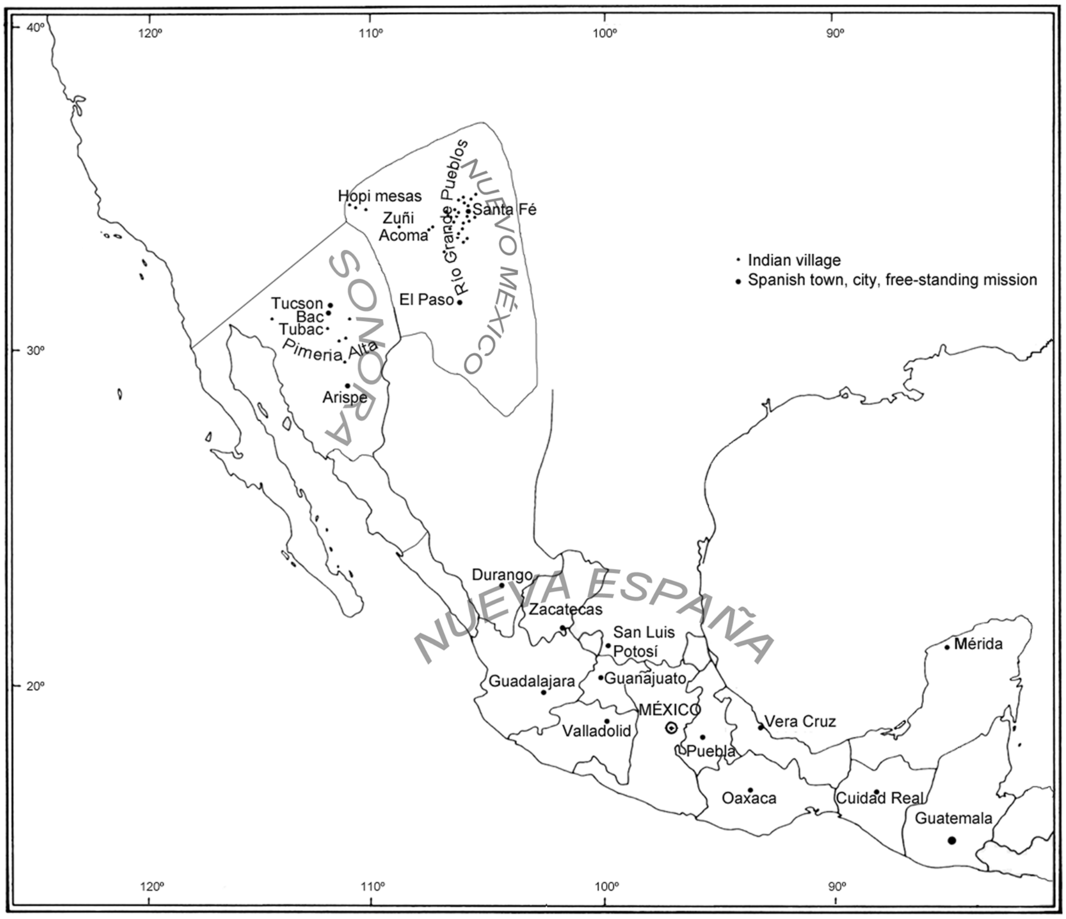

Figure 12.1. A map of New Spain in c. 1785, showing the relationship of major settlements of Nueva España (New Spain) to those Sonora and Nuevo México (New Mexico). Drawn by the author after Gerhard 1993: 18, 20, 280, 315).

of Mexico (Fig. 12.1). It comments on those aspects of contemporary zooarchaeological training that confer advantage, as well as those that present special challenges to researchers seeking to elucidate this crucial dimension of human existence along a broad colonial frontier.

Challenges: Theoretical and Methodological

Over the last few decades, Southwesternists working on the precolonial span have discussed the role of animals in exchange relationships (Habicht-Mauche 2000; Spielmann 1991, 1996), developed a view of hunting as a socially embedded activity (Driver 1990, 1995, 1996), and explored the role of animals in feasting and ceremonial practices (Potter 1997a; Potter and Perry 2000). Such studies demonstrate zooarchaeology's relevance to elucidating inter- and intra-ethnic relationships, the production and circulation of commodities among various communities, and the symbolism of animals in indigenous cultures, going far beyond the "environment and subsistence" to which zooarchaeology is still very often assumed only to testify. For prehistoric zooarchaeological research in general, some of these investigations have been extraordinarily fine-grained in their temporal resolution and in the scope and detail of their analytic methods. Thus, there is a strong tradition in Southwestern zooarchaeology of examining social as well as ecological contexts of the changes in settlement patterns, subsistence, religion, and ethnic identity manifest late precolonial times.

However, until very recently, such levels of analytical detail have seldom been applied to historic period faunal assemblages in the Southwest (but see Tarcan and Driver, this volume). The species list at the end of the site report has endured in analyses of historic sites inhabited by indigenous people and by colonists. Southwestern historic faunal assemblages have been treated in an unengaged and parochial way, despite the rich potential of zooarchaeological research to testify to historic transformations in animal production, household and community culinary processing and foodways, economic relationships, and processes of creolization. The lack of such research has been all the more striking in the comparison with how these questions have been explored by historic zooarchaeologists in the Spanish Borderlands of the southeastern United States (Cusick 1995; Deagan 1985, 1997; Hoffman 1997; McEwan 1991a, b; Reitz 1994; Reitz and Scarry 1985)

Perhaps a lack of curiosity about historic faunas stems from principal investigators' lack of acquaintance with contemporary zooarchaeology. Alternatively, it might arise from a false sense of security in the relatively skimpy textual sources, combined with intuitions about fish and game in "Indian Country." This in turn might flow from the *a priori* assumption that introduction of domestic species resulted instantaneously in an essentially modern configuration of animal use. So many sources attest to the diversity of indigenous and colonial socioeconomic adjustments through the early colonial period that this simply is not realistic. For example, Simmons (1991) notes reports of cloth shortages among New Mexican colonists to the extent of their using cured deerskins from Indian sources for garments. Moore (1992) suggests that lithics recovered from Spanish colonial sites in New Mexico may have been produced by colonists lacking access to metal tools, as these seem to reflect the core reduction technology involved in production of flints for flintlock rifles. The still-sparse archaeological records of the post-Pueblo Revolt interregnum (Preucel 2002) show that Native New Mexicans did not wholly abandon the use of European domestic animals and plants, illustrating to the complexity of the adjustments on the indigenous side.

Some of the neglect of faunal remains as a source of information on local life during the colonial period could be attributed to the exigencies of cultural resource management (CRM) archaeology, the source of the preponderance of archaeological collections since the late 1970s. However, a review of the literature suggests that general attitudes were already well entrenched in Southwesternist historic research before CRM became the main means of acquiring historic archaeofaunas. This neglect is part of a larger problem. As Ayres (1991) points out there has historically and institutionally been a lack of serious research engagement with historic materials throughout much of the U. S. Southwest, a problem also true, perhaps for different reasons, in Mexico (Fournier-García and Miranda-Flores 1992). The final part of this essay will return to these broader themes in historical archaeology in the Greater Southwest.

So, part of remedying the problems outlined above simply involves introducing a better standard of zooarchaeological practice in both research-oriented and CRM archaeology. However, lest zooarchaeologists entering historic studies become too self-congratulatory, most of us have already confronted the fact that, for all our methodological skills and theoretical sophistication, we may not be fully equipped to contextualize and interpret the historic archaeofaunal evidence. The next sections of this paper examine the double dimensions of challenge and opportunity in historic zooarchaeological research in more detail.

(1) Bringing Anthropological Zooarchaeology into a Southwestern Historic Context

If we are to tease out shifts in lifeways and interactions among colonial period people in the Greater Southwest, then archaeofaunas from that time certainly require the close attention to the subtle indicators of animal use selectivity and processing practices that has characterized prehistoric zooarchaeology for the last few decades. Crabtree's (1990) comments regarding method in the zooarchaeology of complex societies, while mainly focused in relation to Old World contexts, are germane here. She argued that zooarchaeology's scrupulous methods of analysis and comparison (*e.g.* MNI, NISP, food utility indices, consideration of taphonomic modifications), though mainly developed in connection with prehistoric hunter-gatherers, were relevant and essential for understanding occupationally diverse and socially differentiated societies. This holds equally true of colonial situations, in which occupational specialization as well social class and ethnic identity formation all may mobilize animals and their products.

Historical zooarchaeology in fact has some excellent examples already in the literature in other areas, including Huelsbeck's (1991) very thoughtful discussion of consumer behavior and the impacts of food supply systems on zooarchaeological evidence, Rothschild and Balkwill's extremely thorough examination of the interplay of anthropogenic ecological change, taphonomy, and socio-economic factors in producing diachronic changes in species composition in Manhattan faunal samples (1993), and work by Reitz and others (Reitz 1994; Reitz and Cumbaa 1983; Reitz and Scarry 1985) on faunas from Spanish Florida in ecological and socioeconomic perspectives.

A small detailed example of how "classic" prehistoric zooarchaeology can interact with architectural evidence to produce cultural information comes from my own as-yet unpublished study of 18th and 19th Century Hispanic settlements near Cochiti Pueblo, of which Wirt Wills was the project director. One small, C-shaped house had an *horno*, a Spanish-style oven made of adobe bricks in the shape of a beehive, in front of its modest courtyard, and postholes reflecting a probable corral on its eastern side. The corral contained several ash lenses and considerable burned bone, reflecting its use as a dump. Comparing specimens from the corral and *horno* areas, I found bones with canid gnawing marks and carnivore stomach acid modification only in the corral sub-sample, where they were ubiquitous, whereas carnivore-processed specimens were absent from the *horno* and house areas. Based on that evidence, I was able to shed some light on space use, suggesting that inhabitants both possessed dogs and probably tied or penned them at the corral, keeping them well away from the food preparation area. That, coupled with the fact that the knowledge of constructing and using *hornos* are traditionally passed along the female line in Hispanic societies, suggests a use of space conditioned by culturally specific everyday practices.

The contributions of this volume further elaborate on the value of combining the methodological and theoretical strengths of prehistoric zooarchaeology with the context of historic and ethnohistoric sources.

(2) Bringing Historical Perspectives into Anthropological Zooarchaeology

As noted earlier, when studying historic archaeofaunas, zooarchaeologists straddle a divide between theory and method as developed in prehistoric archaeology and those research issues and approaches employed in text-aided archaeology. The more senior of us learned prehistoric zooarchaeology with a focus on "culture process" and "adaptation," and much current zooarchaeological writing stresses behavioral ecology and long-term evolutionary processes. If applied to historic cases, these approaches produce less-than-satisfying results, for us, for historic scholars, and for contemporary communities of reference. On the other hand, many of us have had little training in political economy, practice theory, and other conceptual approaches applied to contemporary historic archaeological cases in other regions. While we recognize that we must retool a bit from classical zooarchaeology, the question is how to do so.

I believe that we need not so much to *dismiss* adaptationist interests as to *reframe* them within a context that acknowledges that processes affecting and responding to human actions work on multiple scales of space and time. The "multiscalar approaches" advocated by an increasing number of researchers in both historic and prehistoric archaeology can articulate many dimensions of theory and method – including these – coherently and productively, albeit with some educational tensions and contradictions as one moves between levels. Multiscalar approaches (Freter 2004; Lightfoot, *et al*. 1998; Wilkie and Farnsworth 1999) stem from recognition that local communities are variably but certainly affected by larger-scale regional and global processes of change, including climatic and of global economic. This same point was stressed a decade ago, using different terminology, by James Deetz and Patricia Scott Deetz (1995), who stressed that some changes at the local scale may be explicable in local terms, but by its nature, colonialism implicates the effects of processes often originating at great distances upon local communities.

Incorporation of the Greater Southwest in the Spanish Empire variably stressed, reinforced, or dissolved pre-existing interethnic relations, and instituted new relationships among the indigenous peoples of the region. Goods, persons, and diseases traveled along lines of colonial commerce and political power. Hence, the Southwest in the Spanish colonial period was a complex system of networks, following the meaning of Lightfoot and Martinez (1995), some aboriginal in origin, others instituted during the colonial period, but all tied to the Spanish imperium, however attenuated it may have been in extension of its borderlands, with real consequences at the local level. Our best model for exploring these aspects of Spanish colonialism in the 16th through 19th is the coordinated multidisciplinary research pioneered by those working in La Florida and adjacent parts of the Caribbean (Cusick 1995; Deagan 1973, 1983, 1985, 1997; Ewen 1991; Hoffman 1997; McEwan 1988, 1989, 1991a, b; Reitz 1994; Reitz and Cumbaa 1983; Reitz and Scarry 1985; Skowronek 1993).

(3) Historically contextualizing archaeofaunal samples

To fully develop the potential of historic zooarchaeological to inform on specific human experiences and initiatives in the colonial process, we need to contextualize our analyses to the specific moments in history from which they derive. This "context" actually has several dimensions: temporal, spatial, and cultural. While we will never become professional historiographers, benefits can be reaped by exploring accessible historic accounts and developing working relations with historians working with primary documents, as suggested by earlier zooarchaeological work both in the Southeast and that of Lightfoot and colleagues in California (Lightfoot 2005; Lightfoot and Martinez 1995; Lightfoot, *et al*. 1998).

As has been amply demonstrated in *La Florida* research, reading a colonial archaeofauna depends upon from when in the span of colonial time a sample derives. As in the Florida region, but in very different ranges and registers, important political and demographic differences existed in the relations and respective situations of Hispanic colonizer, indigenous Southwestern Indians, and others through time. In the span between the Spanish colonists' entry in 1598 and the Pueblo Revolt of 1680, a different set of relations, largely following the central Mexican model, pertained in comparison with those after the Spanish Reconquest of 1692–93. Each of these spans differed markedly from the mid-19th Century, which saw penetration of the region by Anglo-American industrial capitalism. Spanish-Pueblo political and economic relations in the Río Grande Valley before and after the Pueblo Revolt proceeded according to different ground rules. Whereas the pre-Revolt political economy involved *encomienda*s, the post-Revolt did not, although other forms of extraction of labor and resources from Pueblos by colonists continued, and in contrast to initial Spanish attempts to suppress Pueblo ceremonies, the post-Revolt *quid pro quo* allowed their practice, if nominally linked to Catholicism (Preucel 2002; Roberts 2004; Weber 1999).

The spatial and cultural provenience of an archaeofauna is relevant, too. For example, Spanish colonization of the Pimería Alta, in what is today southern Arizona and northern Sonora, differed by over a century from that of the Río Grande region in its timing and in the intended purposes of its colonial settlement (Gerhard 1993; Pavao-Zuckerman and LaMotta 2007). The modern state of Arizona thus hosts a mosaic of peoples with long-term colonial relations, some of which must be read against the histories of the Mexican states of Sonora and Sinaloa, while others should be interpreted with consideration of the administration of the eastern and western Pueblos from the colony of New Mexico.

Finally, the extent to which settler colonies, rather than simply missions and military posts or *presidios*, were present in a region needs to be taken into account, whether one is analyzing fauna from colonizer or from Indian settlements, as these came into competition and interacted with Indians in a different way than did religious and military establishments (Lycett 2002; Williams 1992). Moreover, the density of settlers, their gender composition, and relative levels of supply from the home country or colonial metropoles all condition the nature of indigenous-colonist interactions and hence outcomes in everyday life and its archaeological traces. This point has been made clear in comparisons of the well-supplied Caribbean towns with establishments at the farther reaches of Spanish sea or land supply networks (deFrance 1996; Reitz 1994; Ruhl 1997; Skowronek 1993; van Buren 1999).

Interpretively, such contextual factors matter a great deal to zooarchaeologists working with historic faunas. Only if the main stakes and intentions of colonial political economies, including control of commodity production, and the relation of mission enterprises to both indigenous peoples and settlers at a specific point in time, are understood, can faunal evidence be read to its full potential. For example, the predominance of sheep in a Pueblo Indian faunal assemblage in 1670, when Spanish missions strove to exert control over this textile-producing species, can mean something very different from the same datum in 1770, after the Pueblo Revolt and subsequent events caused a wider distribution of the species, to say nothing of 1870, after United States intervention and occupation in New Mexico and Arizona. In these contexts an animal is much more than a packet of protein, fat, and useful raw materials, although it is all these things at the same time. Whether indigenous or introduced, wild or domesticated, animals are markers in a complex and rapidly evolving set of social and economic relationships, invested with symbolic as well as economic value.

Some examples may be relevant here. First, Regina Chapin-Pyritz (2004) has noted the central role of socially marginal households in the speed with which the Hopi community of Awatovi adopted livestock, hypothesizing that they seized a novel opportunity for negotiating better economic and social standing. At Mission San Agustín in Tucson, Pavao-Zuckerman and LaMotta (2007) have documented zooarchaeological evidence for years of indigenous resistance on the part of Tohono O'odham people to adopting livestock production, with a final shift toward cattle production. At the isolated pre-Revolt settlement of Paa-ko, Kojun Sunseri and myself (Gifford-Gonzalez and Sunseri 2007) believe that we have archaeofaunal evidence for maintenance of Puebloan ceremonial life, despite Spanish suppression of public rituals during this period, and the evidence of a chapel in the middle of the historic plaza (Lycett 2002, 2005). Remains of colorfully plumed perching birds and other spiritually significant avian species has been seen as a signature of the emergence of katsina rituals in Pueblo IV sites throughout the Southwest (Clark and Eckert 2004; Potter 1997a, b), and we have the same set of species in the historic Paa-ko assemblage.

(4) Acknowledging the Need to Theorize Relations of Colonist and Colonized

Silliman (2005, 58) makes this distinction: "Colonialism is generally defined as the process by which a city- and nation-state exerts control over people – termed indigenous – and territories of its geographical boundaries." He continues:

> ... care must be taken not to conflate colonization, a vehicle or manifestation of colonialism, with colonialism, a process. Colonialism, in the modern world, although sharing elements with other colonial times, operated on 'fixed orders of racial and cultural' difference (Gosden 2004, 22).

Both terms apply well to the historic impacts of Spanish (and later Anglo-American) occupation of the Greater Southwest. Beginning with the entry of Coronado (1540–1542) intent on locating the cities of Cíbola, and in earnest with the expedition of Juan de Oñate in 1598, *colonization* was clearly the aim, as was in the latter case the founding a settler colony. The enumeration of personnel in the Oñate party reflects the already entrenched racial and cultural *casta* categories of Spanish colonialism: *español (peninsular, criollo), indio, mestizo, negro, mulatto* (Snow 1998). These American transformations of peninsular Spanish 15th Century *casta* categories rapidly meshed with the aims of Spanish colonization and social control in Mexico and other parts of the Americas as new ethnic and racialized categories were defined (Boyer 1997; Carrera 2003; Katzew 2004).

Despite the seeming precision of the blood quantum of the Spanish *casta* system, nothing was simple and fixed in these original categories as they played out in and then expanded from colonial Mexico (Boyer 1997). In contrast with their experiences in most of the Caribbean and La Florida, Spanish administrators and colonists in New Spain met a multiplicity of highly stratified societies unified under an indigenous empire, with its own classification systems for its diverse subjects. Moreover, historic records reflect the differential gains in territory and opportunity of ethnic groups who supported the Spanish overthrow of the Mexica (Aztecs), especially the Tlaxcaltecans, in the early post-conquest period (Gerhard 1993).

Most colonial records reflect only the attempts of Spanish administrators to impose their own order on subjects who included all of the above, plus persons of African origin and their descendants. However, sometimes genealogical and historic data permit insights into what could only have been very complex social dynamics in New Spain and its outliers. For example, class distinctions in the Valley of Mexico probably trumped racial terms. Juan de Oñate's wife, Doña Isabel de Tolosa, granddaughter of Moctezuma, and daughter of Hernán Cortés, was probably not labeled a "*mestiza*" in the *casta* system (Simmons 1991).

More complexities lie beneath the blanket term of "Zacatecan Indians" who accompanied Oñate's colonist party to New Mexico. This mining region was founded in 1546 (only 25 years after the fall of Tenochtitlán) by Cristóbal de Oñate, Juan de Oñate's father, and Juan de

Tolosa among others. As outlined by Gerhard (1993), the Indians with Juan de Oñate were most probably *not* from the dwindling population of indigenes around Zacatecas, whom both Spanish and Nahuatl-speakers labeled *chichimeca*. Rather, the Zacatecan laboring classes were Nahuatl-speaking Tlaxcaltecans and Mexica from the Valley of Mexico and Tarascan-speakers from Michoacán.

At about two generations' remove from the fall of Tenochtitlán, the "*indios*" who accompanied Oñate into the upper Río Grande in 1598 thus can be assumed to have had longstanding, distinct ethnic identities and historical relations to one another, as well as to the *chichimeca* and the Spanish. Adding to the complexity, persons of African ancestry were listed in the Oñate expedition, a highly likely circumstance, given the composition of the 16th Century Zacatecas population. A 1572 census of Zacatecas as included about 350 Spanish citizens, 1500 free Indians, and 500 slaves, of both Indian and African origin (Gerhard 1993,158). Through the 17th and 18th Centuries, enslaved and free persons of African descent came to make up fully a third of the population of Zacatecas (Gerhard 1993, 159).

To sum up, in contrast to the situation in the more eastern Spanish borderlands and much of the Caribbean, colonists moving into the Greater Southwest were themselves ethnically diverse (and here I will simply acknowledge the important diversity hidden by the term "*español,*" the Castillian, Extremeduran, Basque, Galician, Jewish *converso*, *et al*.). The 17th to 18th Century disappearance in New Mexico of some *casta* categories (*negro* and the Mexican Indian ethnicities), as well as the blending of *mestizo* into *español*, and later *hispano*, should not obscure the multiplicity of identities and agendas that typified the Greater Southwest's earliest colonists. A similar trajectory, with slightly different players, could be traced for the colonization of the Pimería Alta.

In terms of zooarchaeology, this background is relevant because the Spanish colonial venture in New Mexico and Arizona was *already* syncretic, notably in its foodways. The presence of more Mexican Indian women than peninsular or creole in Oñate's expedition, the mixed heritage of Oñate's own household, and presence of a *comal*, or central Mexican *tortilla* griddle in the personal inventory of one of Oñate's "Spanish" colonists (Snow 1998) all hint at this complexity, as does historical documentation of a Tlaxcaltecan *barrio*, Analco, in Santa Fé.

Challenges and Opportunities in Our Intra- and Extra-Disciplinary Conversations

"All Dressed Up and Nowhere to Go"? Methodological Dilemmas of Collaborative Work

As stressed by Elizabeth Wing and Antoinette Brown (1979) many years ago, foodways and other details of daily life can only be studied with multiple, independent lines of evidence, collected and analyzed with common goals. Zooarchaeologists who do not run their own excavations are not in a position to dictate analytical strategies applied to other datasets, and many work with cultural resource management project collections that often have their own specific limitations of size and completeness. Put untactfully, do zooarchaeologists risk completing a thoroughgoing, professionally cutting-edge zooarchaeological analysis, only to find that it is not equaled in texture by our colleagues' analyses of artifacts, architecture, and space use?

Traditional methods of excavating pre-contact pueblos and expectations about analytic resolution in ceramic or lithic datasets, if followed in historic contexts, may militate against recovering information on daily practice at the household scale. What is needed is temporally and spatially fine-grained recovery, specific to rooms and their adjacent exterior living spaces and middens. Lightfoot, *et al*. (1998) were able to discern distinctive, syncretic patterns in space use, house form, foodways, and refuse disposal at the multicultural settlement of Fort Ross by closely tying refuse to interior and exterior spaces and by interpreting it within multiple lines of ethnographic and ethnohistoric evidence for house construction, culinary processing, and housekeeping among the different ethnic groups who contributed members to this settlement. Early colonial Pecos Pueblo and Santa Fé comprised similar pluralistic aggregations of people in various states of servitude and freedom in a new environment. Will Southwestern archaeologists, excavating historic sites as they usually dig precolonial ones, be able to readily elucidate such data sets?

To take the example from ceramic analysis in the British orbit in North America, Ferguson's historic research (1991; 1992) demonstrated that archaeologists should seek subtler expressions of foodways than simply searching for different "styles" or types in multiethnic communities. He stressed that specific choices from an array of available vessels may also reflect the tactics of culturally distinct foodways. Wilkie and Farnsworth's (1999) study of comparative study Bahamian enslaved Africans' and master's ceramic assemblages demonstrated slaves' selective vessel choice from a range of mass-produced European ceramic forms, also illustrating that a single set of ceramic forms can nonetheless reflect divergent food preparation and consumption patterns.

We know from historic sources that early colonial Spanish and Mexican Indian colonists in the northern Río Grande mainly used Puebloan pottery for their food preparation and service. Can zooarchaeologists expect Southwestern historic ceramic analyses to discern distinctive patterns of colonist choice from the array of Puebloan vessels existed? Could we ever hope to explore diversity within the colonists? For example, did households from the Santa Fé's Tlaxcaltecan *barrio* of Analco select differently than, say, those who defined themselves as Spanish and hewed to peninsular culinary practices (or did anyone)? In other words, are we collecting ceramic and other artifactual data in a way that will enable us to reconstruct foodways?

A related problem that some of us have already encountered is the lack of analyses of *aboriginal* reference assemblages in the same level of detail, either in fauna or in other datasets. If we want to monitor colonial era changes in everyday food preparation or housekeeping among the Tohono O'odham, Pima, the Zuñi, Hopi, Río Grande Pueblos, or Apache settlements, or the emergence of the Navajo as a distinct ethnic group, what precolonial analyses can we consult? Must we ourselves reconstruct precolonial culinary practices in parallel with our own historic research, because Southwesternists engaged in prehistoric research have not been overly concerned with Puebloan and other foodways? It would be very helpful to share information on good analyses of culinary datasets, since sometimes excellently detailed work resides in the CRM "gray literature."

Working Collaboratively with Descendant Groups

Zooarchaeologists can potentially provide tribes and other descendant groups with details on their colonial histories that have been obscured by layers of territorial expropriation, Indian schools, and "official histories" written in Anglo-American times. In contrast to the productive but nonetheless difficult juxtaposition of archaeologists' and Indians' stories about precolonial indigenous pasts, in the colonial period, Indians were perforce living at least some of their lives "on white man's time" and subject to the disciplines, calendars, and extractive demands of a nascent capitalist colonialism. Archaeological interpretations of this time span may still diverge from those of Indian traditions, but in a qualitatively different, and perhaps more readily negotiable, way.

Some Southwesternist historic archaeologists have already been working collaboratively with tribes in this manner (Liebmann, *et al.* 2005; Preucel 2002). However, zooarchaeologists are only now beginning to involve themselves with tribal histories. We have also understood that the historical knowledge held by tribes and by descendants of early colonists could enrich archaeological interpretations and shed light on specific moments in regional history. Examples of such rich, mutually informative interactions are seen in Zuñi historical research (Mills, personal communication, 2005) and in that of Lightfoot *et al.* (1998) with modern Kashaya Pomo over the history of indigenous involvement with Russian traders at Fort Ross, California.

Prospects and Opportunities

In closing, I will note several points that may repay further thought and action, from the more specific to the more general, and including topical, practical, and methodological aspects.

First, the brief interregnum between the Pueblo Revolt in 1680 and the years around the de Vargas's reconquest in 1692–93 is of special interest. Zooarchaeology can help supplement ethnohistoric testimony to movements and mergers of Puebloan and other Indian families and corporate groups fleeing the Spanish reconquest while all the time coping with ongoing dislocations caused by drought, Eurasian disease, and escalating raids by hunter-gatherers. How were domestic animals used during the Spanish absence? Did different groups take divergent paths? Regina Chapin-Pyritz (2004) has some evidence of this from Hopi, and it would be fascinating to further fill in the record.

Second, small atypical sites may be very informative and should be studied. Earlier, statistically minded processual archaeology held a bias against small sites and samples, but this has been tempered more recently with a recognition that such locales and samples may reflect activities that otherwise not represented in larger sites and samples, such as garden sheds and huts. However, an even more pressing theoretical reason to examine these sites is what we understand about the nature of human response to rapidly changing conditions. In several documented cases, it has been noted that people respond to severe stress by experimenting, probably desperately, with a wide variety of tactics, many of which probably failed. These tactics are by their nature short-term, diverse, and depart radically from what came before. Jochim (1996) has seen this with the response of Late Magdalenian hunter-gatherers in southern German as they coped with catastrophic climate change at the end of the Pleistocene. There, formerly regularly patterned transhumance and site-specific activities were replaced by seemingly chaotic movement and subsistence tactics. Rathje also saw similar experimentation in meat use during OPEC oil crisis of the 1970s in the USA, when people actually appear to have wasted purchased foods while experimenting with cheaper cuts of meat, *etc.* (Rathje and Murphy 2001). Therefore, we need to consider that small, "atypical" sites may not be "outliers" of the norm but instead the signals of people coping with catastrophic change, in this case multiply driven by disease and demographic collapse, drought, military incursions, and colonization. This kind of a focus will inevitably bring us to some of the scalar issues already explored for Pueblo III faunal samples by Muir and Driver (2002), but this will be a good thing.

Third, James Deetz and Patricia Scott Deetz (1995) raised a comparative research question which would repay investigation with Southwestern colonial materials. This is the deliberate and sometimes wholesale discard of items brought from the mother country, as well as redesign of space by third-generation colonists, about 50 years past the founding of a settler colony. Deetz saw this both in colonial English America and Anglophone South Africa and argued that it represents a kind of creolization process. Might a similar effect be discerned among later colonists' lifeways in the Greater Southwest? However, it is possible that differences between Deetz's two examples, both colonies relatively well-supplied with goods by ocean trade, and the New Mexico and Pimería Alta, where metropolitan goods had to be laboriously carted overland from Zacatecas and were usually in very short supply, might obscure such shifts toward creole identity (Fig. 12.1). Nonetheless, Voss (2005) argues that processes of creolization with the intent of achieving a kind of ethnogenesis took place in an almost equally out-of-the-way and under-supplied Spanish colony, California.

It is certainly too early to discern at this point, but we should be alert to the results of processes of creolization, and the formation of what Gosden (2004) has called "middle ground" in the Greater Southwest. Because food species choice and culinary practices are at the heart of much of identity formation, zooarchaeologists are well-placed to comment usefully on such issues, as have those working on Spanish and Indian encounters, colonial relations, and creolization in the Southeast (Deagan 1983).

Fourth, zooarchaeologists working as anthropological archaeologists in the historic time range may contribute to general zooarchaeological theory, especially in the less developed area of social zooarchaeology. While the social and symbolic dimensions of animals are clear in historic situations, these aspects of animals were most probably equally the case in earlier, precolonial times. Given the rich ethnographic, ethnohistoric, and historic context of materials from the colonial period, we have a chance to search for redundant, quasi-uniformitarian relations between patterning in the data and these less readily accessible social and cultural aspects of animal use.

It would be very helpful for all zooarchaeologists working in the region to share information on a regular basis. Good analyses of various prehistoric and historic datasets may reside in regional gray literatures. Specific methodological data, such as the sheep-like metapodia of Spanish goats – well known in Spain but not to me! – should be shared. Several possibilities for data sharing exist, including *Zooarchaeological Research Notes,* the ICAZ Newsletter, and meetings at both the Society for Historic Archaeology and the Society for American Archaeology.

Finally, one must explore the differences between the productive and historically textured zooarchaeology of *La Florida* and the Spanish Caribbean and the much less developed parallels in the Greater Southwest, including both the U.S. and northern Mexico. This contrast holds true to all aspects of historical archaeology, not just zooarchaeology. In the first case, two institutions, the Florida Museum of Natural History/University of Florida and the George State Museum/ University of Georgia, have for over three decades included in their missions the historic archaeology of Spanish settlers, people of African descent, and indigenous people. To date, no institution in either the U.S. Southwest or northern Mexico has defined the historic period of this region as a priority for study. This inevitably leads to a lack of courses in institutions of higher education that regularly offer historiographic and historical archaeological training for archaeologists of the colonial period in the Greater Southwest. This situation has shifted slightly at the University of Arizona, where a historic zooarchaeologist trained in the Southeast has been hired (see Pavao-Zuckerman, this volume). However, Ayre's 1991 complaint still unfortunately holds true in the region despite the presence of three state government-sponsored institutions of higher education, all distinguished for their research and teaching on prehistoric archaeology.

Why is this so? Fournier-García and Miranda-Flores (1992) argue that the lack of attention to the historic period in Mexico stems from several causes, including the dedication of most historic archaeological funding to restoration of buildings deemed to be national patrimony, as well as a under-funding of social process-focused research in the historic period. These authors argue that the latter stems from a reluctance on the part of central authorities to fund research that might challenge the grand narrative of Mexican identity, which features inclusion of an indigenous heritage, but only in the service of constructing a *mestizo* national subject. The case of the U.S. Southwest differs, because the dominant national narrative does not admit Indian admixture as an ingredient in national identity, however, some aspect of national historical narratives may subtly influence the continued lack of attention to historic Native American and Hispanic sites.

The United States acquired Arizona and New Mexico, along with Nevada and California, through the Treaty of Guadalupe Hidalgo in 1846, when Hispanic colonization was in its third century. Tensions between "Anglo" settlers and the numerous long-established Hispanic communities in both of these border states have remained through the ensuing 150 years, though expressed differently in the two. From the 1960s onwards, Chicano activists in the Southwest have decried official histories that excluded the appropriation of Hispanic lands and water rights by Anglo-American settlers. In this way, perhaps some unintended parallels exist between the Mexico situation, where official narratives are not to be undermined, and the U. S. Southwest. The lack of research by archaeologists into Hispanic history during the colonial and Anglo-American periods is especially striking in New Mexico, where the Hispanic community is large and some members are quite politically influential. Hispanic descendents of the original settlers have served as governors, senators, and congressmen in the Anglo-American period. However, the main research institution in the state, the University of New Mexico, as yet has hired no permanent faculty to deal either with Hispanic or Indian archaeology in colonial times.

Based upon many unhappy experiences with anthropologists and archaeologists during the Anglo-American period, Native Americans in the late Twentieth Century increasingly grew to resist ethnography and excavation on what remained of their tribal lands, except when the latter was done under tribal supervision. After the passage of the Native American Graves Protection and Repatriation Act (NAGPRA) in 1990, new accommodations have been reached in specific local situations (Dongoske 1996; Ferguson, *et al.* 1996). Among the new directions in collaborative research between tribes and non-Indian archaeologists is research into the historic period, for which the only written records are those of the colonizers (*e.g.* Preucel 2002). However, it is notable again that, with one exception, the archaeologists most involved in this are either tribal employees or based in academic institutions outside the Southwest. Has historical archaeology of Native Americans been ignored because it is easier to work on less problematic ground than the colonial period? As is the case with the Hispanic community of reference, one wonders how long departments in the region will hold back from developing teaching and research programs relevant to large and increasingly powerful members of their constituencies.

Conclusions

I have argued that it is a good thing that most of zooarchaeologists of the colonial Spanish Borderlands in North America have roots in anthropological archaeology, either directly, or through the rigorous historical zooarchaeology tradition pioneered at the Florida State Museum/Florida Museum of Natural History (Pavao-Zuckerman and LaMotta in press; Reitz 1994; Reitz and Scarry 1985). We are used to working with relatively meager datasets. Historic records, even if they should not be treated as objective reportage, provide the richness of contextual meanings that long ago drew James Deetz toward historic archaeology. From our present vantage point, we now are able to incorporate sophisticated approaches to historic cases pioneered by Deetz, Deagan, and the first wave of anthropological archaeologists to take up historic studies. We can take advantage of multiscalar approaches, use such tools as practice theory, and follow the tactics for assemblage analysis that have worked well for Reitz, Bowen, Ewen, and others working in the US Northeast and Southeast.

Given its fine temporal resolution, historic archaeology of the Americas not only documents the inexorable path of colonialism already known from textual sources, but often, and poignantly, the Law of Unintended Consequences. By testifying to a fundamental aspect of human economics, historic zooarchaeology can contribute valuable insights into the lived experience of colonizer and colonized during what must have been tumultuous times, full of both tragedy and opportunity.

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13. Animal Husbandry at Pimería Alta Missions: El Ganado en el Sudoeste de Norteamérica

Barnet Pavao-Zuckerman

Documentary evidence from the southwestern region of North America indicates that Spanish missionaries attempted to alter the daily lives of native peoples through the introduction of Eurasian domesticated animals and animal husbandry practices. However, our understanding of the degree to which these efforts were successful is hindered by a dearth of zooarchaeological evidence. Excavations at 18th-century missions in present-day northern Sonora and southern Arizona provide an opportunity to examine the practice of animal husbandry at colonial period missions. Zooarchaeological analysis suggests that efforts to introduce ranching met with greater success than in other colonial regions, and that the derivation of secondary livestock products was an important economic activity at the missions.

Keywords: missionization, Arizona, Sonora, animal husbandry, historical archaeology

Introduction

The Spanish colonial strategy in North America entailed the incorporation of indigenous peoples into colonial economic systems in the context of religious conversion and "civilizing" efforts. Missionaries sought to modify the daily lives of Native peoples to reflect European perceptions of "civilized" life, and they sought to create economically viable and profitable colonies to support future missionization and other colonial enterprises. Part and parcel of both of these efforts was the introduction of Eurasian domesticated livestock and the acceptance of animal husbandry practices by Native peoples. However, zooarchaeological evidence suggests that these efforts met with mixed results. In southeastern North America, zooarchaeological evidence indicates that missionaries were not generally successful in their attempts to introduce animal husbandry. Reitz and others (Reitz, 1991, 1993, 1995; Weinand and Reitz, in press) observe that Spanish colonists in the Southeast were more likely to experience changes in their subsistence strategies than were Native Americans.

In the southwestern United States, the traditional focus on prehistoric sites has, until recently, limited our understanding of Spanish colonization to information gleaned from historical documents, rather than from extensive archaeological evidence. This contrast is particularly evident in the Pimería Alta, the region encompassing northern Sonora, Mexico and southern Arizona, in the United States (Figure 13.1). To date, only five Pimería Alta missions have yielded zooarchaeological remains, and much of these collections remains unstudied (Di Peso 1956; Gillespie 1992; Olsen 1974).

The documentary record is only somewhat helpful to our understanding of the impact of the introduction of domesticated animals on Native Americans of the Pimería Alta. Father Eusebio Francisco Kino was the first person to intentionally introduce Eurasian domesticates to the region, including cattle and wheat. Wheat was quickly adopted by Native American groups, and it appears that the spread of horses preceded Father Kino's travels. In the seventeenth century, horse raiding was already a significant source of stress for indigenous peoples living in the San Pedro River valley. However, while horses were quickly incorporated into daily life, it is not clear whether other types of livestock were also present in significant numbers before Kino's forays. As Kino rarely spent any length of time at the missions he established, and permanent missionaries were often decades away, it is also not certain how long Kino's cattle lasted after his departure. Some scholars argue that after the missionary and his entourage moved on to other areas, the exploitation of livestock by indigenous peoples was more akin to hunting than husbandry (Spicer, 1962, 546). In the absence of prior experience with intensive animal husbandry, and without more than cursory training by Kino, it is unlikely that these animals were intensively managed. If the animals were not all killed outright, it is likely that they were permitted to roam free and may have become semi-feral over time. In areas where Kino was not

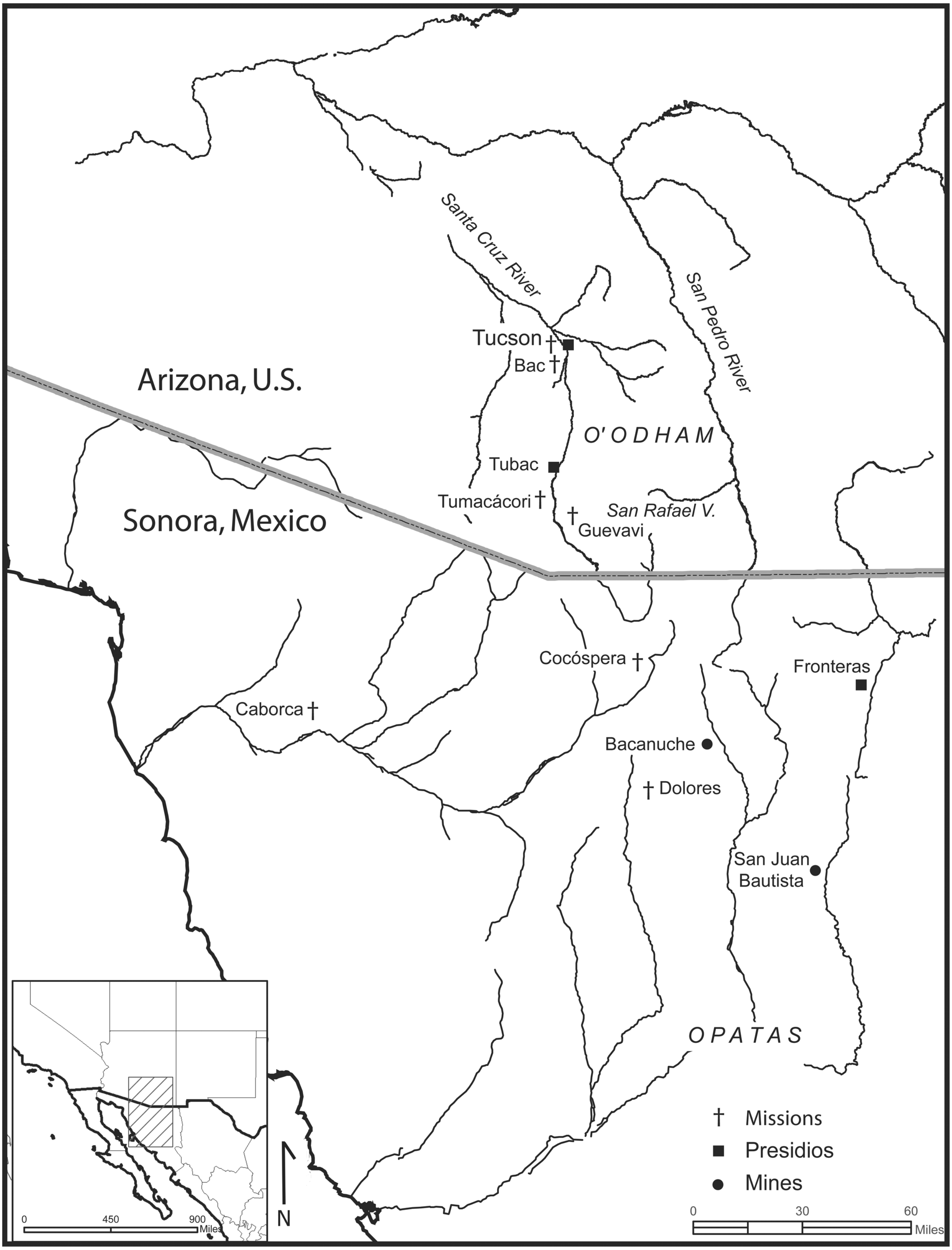

Figure 13.1. Map of Pimería Alta with sites discussed in text.

replaced by permanent missionaries, it is likely that this pattern persisted for several decades.

However, under the influence of resident missionaries, animal husbandry took hold at many communities in the Pimería Alta. By the mid-eighteenth century, many resident missionaries praised their successes at introducing animal husbandry, although other missionaries complained about the perceived recalcitrance of native peoples to accepting a sedentary, animal husbandry-based lifestyle (Dobyns 1976, 9). After the expulsion of the Jesuits, and their replacement with Franciscan missionaries, it appears that livestock herds at missions expanded dramatically (Radding 1997, 92–95).

As observed above, one of the goals of missionization was to compel native peoples to settle permanently and live in villages near the mission, based on the Spanish ideals of town life. Missionaries hoped to reap the benefits of neophyte labor to support mission activities. In return for their labor, mission converts were provisioned with food from the mission's herds and crops. The surplus products of Native American labor were used to acquire finished goods, such as religious paraphernalia and household goods (Radding 1997, 67). Most missions were important economic hubs within regional economic systems; surplus resources were used to help establish new missions, and to support secular, mining, and military colonies within the region. Missions provided livestock on the hoof and food provisions, as well as products such as soap, candle wax, cloth, and leather goods to their colonial neighbors (Radding 1997, 67–72). Mission ranching activities focused not only on foodstuffs, but also on saleable secondary products, such as tallow, wool, and hide that were derived from domesticated livestock carcasses. Tallow, in particular, was used in a number of applications in the eighteenth century, including the manufacture of food-grade greases, soaps, candles, and lubricants. Candles and tallow for lubricating cart axles were in high demand for use in the mines in northern Sonora during this time period (Trigg 2005, 187). Cattle hide was an important raw material to the mining industry for the manufacture of bags for hauling mineral ore (Trigg 2005, 187). In some areas, missions may also have been an important source of wool for textile weaving, although little mention is made of the importance of wool as a commodity in the Pimería Alta.

The above discussion includes general observations about the role of mission communities in the Spanish colonial economic system. However, it is very likely that the economic integration of missions was highly variable. Missions on the frontier, such as those in the northern Pimería Alta, may not have played such a large role in regional economic networks as missions that were located in closer proximity to colonial markets. At frontier missions, it is likely that mission labor was more heavily invested in basic subsistence needs rather than in the production of saleable products for local or regional markets. Zooarchaeological evidence can be used to assess the degree to which mission livestock were exploited for meat or secondary byproducts to meet local and regional needs.

In this paper, I present zooarchaeological evidence for the practice of animal husbandry at two missions in the northern Pimería Alta. I specifically address whether the faunal assemblages from the two missions yield evidence of regional market integration through the production of secondary animal products such as hide, wool, or tallow, or whether the assemblages reflect primarily subsistence-related activities. First, I outline the zooarchaeological methods and the patterns in the zooarchaeological evidence that are expected to demonstrate that secondary animal product processing occurred at the missions.

Methods

All zooarchaeological remains from were analyzed using standard zooarchaeological methods (Reitz and Wing 1999) and the modern comparative collection housed in the Stanley J. Olsen Laboratory of Zooarchaeology (Arizona State Museum, University of Arizona). While more detailed analyses employ multiple summary statistics, only NISP (number of identifiable specimens) is used below. NISP has many known biases, including a tendency to overemphasize large-bodied animals over small-bodied animals. The notation "cf." is used here to denote identifications that were made with a small degree of uncertainty. This notation was most often used when taphonomic processes such as breakage and gnawing obscured diagnostic features.

Epiphyseal fusion was recorded when available in order to estimate age at death for ungulates in both assemblages (Reitz and Wing, 1999, 76; Severinghaus, 1949; Silver, 1969). While all human and other taphonomic modifications were recorded when noted, the analysis below focuses specifically on cut and hack marks that result from butchering, and the extraction of secondary animal products. Cut marks can be produced during carcass disarticulation, or during the removal of meat after cooking. Hack marks, percussive blows from sharp instruments, are more likely to result from initial dismemberment rather than post-cooking consumption.

Zooarchaeological Evidence for Secondary Product Processing

According to ethnographic and archaeological evidence, before the use of industrial technologies, grease or tallow was produced by breaking bones, particularly limb elements from medium and large mammals, into pieces and boiling them, resulting in a high degree of bone fragmentation (Binford 1978; Mateos 2005; Outram, 2002; Stiner 2005). The German Jesuit missionary Ignaz Pfefferkorn recorded the practices of cattle slaughter and processing in use in Sonora during the late eighteenth century (Pfefferkorn 1949 [1795]). Fat and tallow was removed during two stages. During initial butchery, large deposits of fat and tallow were removed, melted, and preserved in bladders, intestines, or ceramic vessels (Pfefferkorn 1949 (1795), 100). The second phase of tallow processing was described by Pfefferkorn as follows:

> Those who slaughter several cattle at one time throw all the bones and marrow into a kettle full of water, cook them, and skim off the fat floating on top. … Tallow is either kneaded together after all fibers have been separated from it by much pounding, or it is melted. In this condition it is kept until candles are made or soap is boiled (Pfefferkorn 1949 [1795], 100).

Cattle bones, particularly limb elements, are large and likely needed to be broken into smaller kettle-sized pieces prior to boiling. Therefore, it is expected that zooarchaeological evidence for eighteenth-century tallow processing in the Pimería Alta will include high rates of fragmentation of cattle remains. It is also expected, based on Pfefferkorn's description, that all parts of cattle carcasses would be processed in this manner, not just the meatiest portions. Pfefferkorn praised the high fat content of Sonoran cattle, claiming that even lean animals yielded over 50 pounds of fat and an equal amount of tallow. According to the missionary, the greatest profit from cattle came not from meat, but from fat and tallow; he noted that the rendered tallow and fat from one carcass could be worth twice the value of the whole live cow. He also observes that Sonoran mines paid a premium for these products.

Wool production is generally reflected in zooarchaeological assemblages in the abundance and age structure of wool-bearing species such as sheep. When sheep's wool is a significant primary product, it is expected that these animals would appear in high numbers in archaeological assemblages. It is also expected that fewer animals would be slaughtered at a young age compared to sheep herds that are managed for meat yield (Dahl and Hjort 1976). In herds that are exploited primarily for meat, sex ratios in the living herd are often heavily skewed toward adult females. Only a few males would be permitted to reach adulthood to produce the next generation. When the primary goal is wool, not meat, sex ratios are likely a less important consideration in herd management. However, it is unlikely that sheep herds were ever managed exclusively for meat or for wool.

Butchering marks are the most common zooarchaeological evidence employed to examine the processing of animal carcasses for hide or skin. Skinning marks are cut marks left by the butcher's knife during the removal of the hide. These marks are commonly found on the extremities of animal carcasses, where the skin adheres most closely to the underlying bone, including the distal mandible and maxilla, around the horn or antler base, metapodials, phalanges, and, occasionally, podials (Guilday *et al.* 1962; Pavao-Zuckerman 2007). Skinning marks often appear as groupings of cuts in the same location and oriented in the same direction, most often perpendicular to the main axis of the bone. However, it should be noted that skinning marks are not always left behind when a carcass is processed for hide (Reitz and Wing 1999,128).

Mission San Agustín

Mission San Agustín de Tucson was established near an existing Native American farmstead on the Santa Cruz River in what is now Tucson, Arizona in the southwestern United States (Figure 13.1). San Agustín was at first a *visita* to the head mission, San Xavier del Bac, located fourteen kilometers to the south. As a *visita,* San Agustín lacked a resident priest. The community was serviced by the resident priest at the nearby mission of San Xavier del Bac, who occasionally visited the neophytes at San Agustín to provide mass, baptisms, and other services. San Agustín received its first resident priest in 1757, but this presence was short-lived; the community did not become a full-fledged mission until after the expulsion of the Jesuits in 1767 and the arrival of Franciscan replacements. Several O'odham Native American (formerly known as the Pima and Papago) groups resided at the mission. In 1775, the military garrison at Tubac was moved 80 kilometers north to a site across the river from San Agustín; mission surplus was sold to the garrison to aid its transition in its new location.

The zooarchaeological remains from San Agustín presented here were excavated by Desert Archaeology, Inc., and were deposited between 1795 and 1820, at the height of the mission period. Zooarchaeological materials were excavated from a roasting pit, three trash scatters, and three other features. These remains likely represent an amalgam of subsistence and economic activities that took place within the mission. They should be seen less as direct evidence of O'odham or missionary diet and more as evidence of the subsistence and economic activities in which missionized O'odham engaged.

Zooarchaeological Remains

Detailed analyses of zooarchaeological materials from San Agustín are presented elsewhere (Pavao-Zuckerman and LaMotta 2007); what follows here is a generalized discussion of animal husbandry and economic strategies at the mission. The San Agustín assemblage is the largest studied assemblage from a Pimería Alta mission, with a sample size of nearly eight thousand identified specimens (NISP = 7933). An additional 1091 specimens were not identifiable to Class and are not included in the above total. Domestic animals, including chicken, cat, equines, cattle, and caprines dominate the assemblage; however, a variety of wild taxa were also identified including herpetiles, wild birds, rabbits and hares, small rodents, collared peccary, and deer. The overall economic pattern at San Agustín as revealed in the zooarchaeological record is one of primary reliance on animal husbandry (Figure 13.2). In particular, cattle-ranching appears to be the dominant economic activity at the mission. Cattle contribute over ninety percent (n = 341) of the domesticated livestock assemblage, and the sample contains large amount of unidentifiable large mammal fragments that are within the size range of cattle. No caprine specimens could be conclusively identified to either sheep (*Ovis aries*) or goat (*Capra hircus*); all are identified to the inclusive subfamily, Caprinae. Caprine specimens are uncommon (n = 23) in

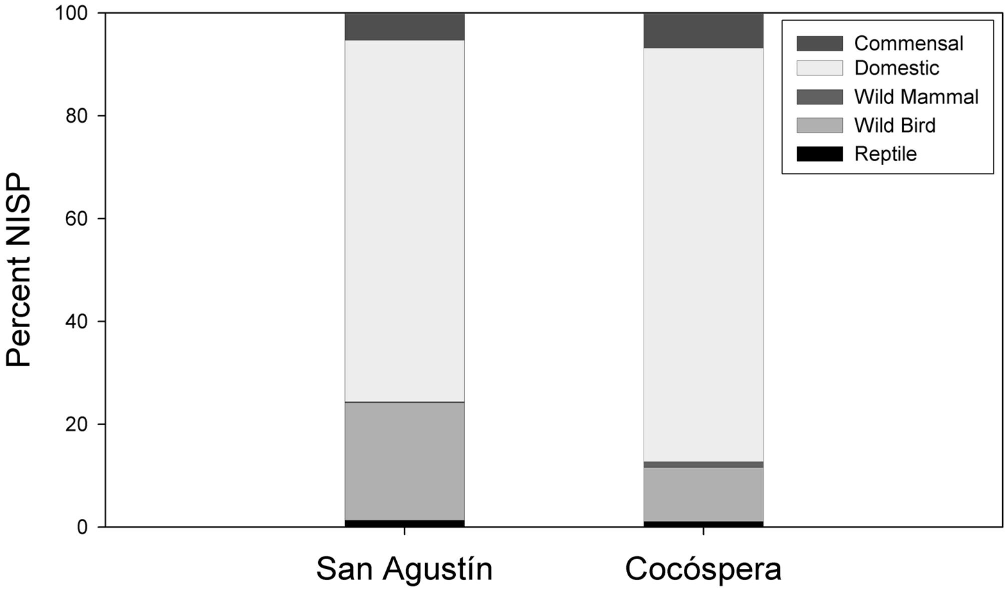

Figure 13.2. Summary of zooarchaeological remains from Mission San Agustín (NISP = 7933) and Mission Cocóspera (NISP = 3379).

the assemblage, suggesting that these animals played a smaller role at the mission. The caprine sample is too small to permit examination of herd age structure, although it is worth noting that eight of the nine caprine specimens for which bone fusion could be observed were fused at death. Only one specimen could be interpreted as indicating the presence of a subadult in the sample.

The greater frequency of cattle over caprines is similar to ethnohistorical evidence from the head Mission San Xavier del Bac. In a 1737 survey of livestock herds at Bac, cattle outnumbered sheep and goats combined (Olsen 1974). However, the archaeological evidence from San Agustín presented here suggests that a wider disparity between cattle and caprines existed at the former *visita.*

Some evidence for carcass processing was noted in the San Agustín assemblage. Several cut marks were noted at strategic positions on cattle forefeet, hindfeet, and mandibles (Figure 13.3). Additional cut and hack marks were noted on meat-bearing elements, suggesting that these carcasses were also processed for meat. The San Agustín assemblage is also highly fragmentary. The fragmentation index for medium and large mammals at San Agustín, calculated by dividing MNE by NISP of all medium and large mammal remains, is extremely low (MNE/NISP = 0.19), indicating a very high degree of bone breakage. The pattern of intentional bone breakage at the mission includes limb elements, but also extends to low-utility elements such as metapodials, podials, and phalanges.

The overall pattern at Mission San Agustín suggests a primary reliance on cattle ranching with extensive post-mortem processing of cattle carcasses. At San Agustín, it appears that cattle carcasses were processed for both hide and tallow. Finally, the low frequency of caprine remains relative to cattle specimens suggests that wool was not a primary commodity produced by the mission.

Mission Cocóspera

A team of archaeologists from the Instituto Nacional de Antropología e Historia (INAH), Sonora, lead by Júpiter Martínez Ramirez, recently completed archaeological investigations at the site of Mission Nuestra Señora del Pilar y Santiago de Cocóspera, located in northern Sonora, Mexico. The excavations at Cocóspera represent the initial stage in a mission archaeology program developed by Martínez for INAH-Sonora. Future work by this team will focus on other Sonoran missions and will greatly contribute to Spanish missionization scholarship in the Pimería Alta.

The mission at Cocóspera was established in the late 1680's by Father Kino among a modest population of about 150 people. The site of Cocóspera is located about 120 kilometers from San Agustín, and closer to the mining industries in northern Sonora. It is not known precisely which groups resided at the mission; however, most were probably O'odham, including Hímeri-speaking Pimas, and possibly Sobaipuris who were brought in by Kino in the early eighteenth century to build the mission church. After Kino's departure, much like at other missions, Cocóspera was left without a resident priest. For most of the eighteenth century, Cocóspera functioned as a visita to the head mission at Suamca and was serviced by the head mission's priest. Cocóspera did not become a head mission with its own resident priest until after the arrival of the Franciscans in 1768.

Zooarchaeological remains from Mission Cocóspera were excavated from three contexts, including wall and ceiling fall inside the church, a test unit located at the approximate location of the southern mission wall, and a structure of unknown function to the west of the mission church. It is believed that the materials from Cocóspera pre-date the materials excavated from San Agustín, and

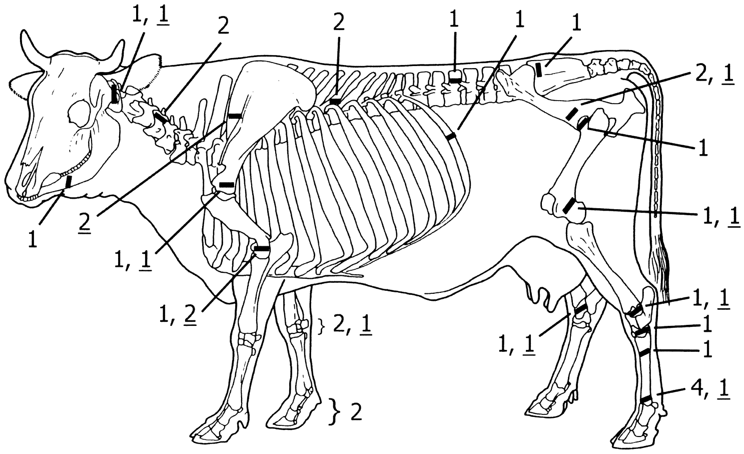

Figure 13.3. Cut and hack marks (underlined) on cattle remains from Mission San Agustín.

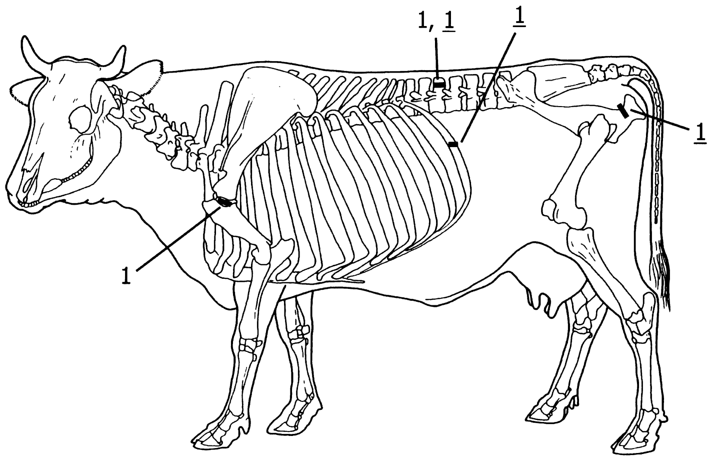

Figure 13.4. Cut and hack marks (underlined) on cattle remains from Mission Cocóspera.

may have been deposited in the mid-eighteenth century. As analysis of materials from Cocóspera is on-going, preliminary results presented below include only materials from the western structure of unknown function. As at San Agustín, the zooarchaeological remains from Cocóspera are treated here as reflecting generalized butchering and carcass exploitation strategies carried out by the O'odham residents of the mission.

Zooarchaeological Remains

A total of 3,379 specimens were identified from the western structure at Cocóspera. However, over ninety percent of the assemblage was identifiable only to Class, roughly half of which are from large mammals. The identifiable sample contains a variety of wild and domestic animals including herpetiles, wild and domestic birds, rabbits and hares, small rodents and carnivores, javelina, deer, and Eurasian domestic animals including chicken, donkey, cattle, and sheep.

The percent NISP of the assemblage is dominated by domestic mammals, particularly cattle (n =113). Caprines appear slightly more common relative to cattle at Cocóspera than at San Agustín; however, the sample size (n = 30) is too small to warrant interpretation. Both sheep (n = 4) and goat (n = 2) were identifiable in the assemblage, although the majority of specimens were identified only to the inclusive subfamily Caprinae (n = 24). Very little evidence for age at death of caprines is available in the small sample, but all evidence to date is from mature animals.

As observed above, about half of the specimens identified only as mammal are from the size range that includes domesticated livestock. It is likely that the estimated contribution of these taxa is underestimated, as the assemblage from Cocóspera is also extremely fragmentary. The fragmentation index for the western structure at this mission is also very low (MNE/NISP = 0.09). Cattle specimens from all carcass regions are present in the sample, indicating that animals were butchered locally, and that bone breakage was not limited to meat-bearing elements. No skinning marks were noted, but the lack of these marks is likely due to the small sample size. A few (n = 5) cut and hack marks were noted on meat-bearing elements, suggesting that cattle carcasses were also processed for food (Figure 13.4).

The preliminary results from Mission Cocóspera indicate that cattle-ranching was the predominant activity at the mission. The high fragmentation of the cattle assemblage suggests that these carcasses were processed for tallow, but insufficient evidence exists to support the hypothesis that cattle carcasses were also processed for hide. Likewise, the caprine assemblage is too small to evaluate herd management strategies that might shed light on the importance of wool at the mission. However, the low frequency of caprine remains relative to cattle remains suggests that there was not a well-developed wool industry at this mission.

Discussion

Comparison of the two missions is hampered by the temporal separation of the deposits available for study from the two sites. However, broad similarities exist between the two assemblages. The contribution of domestic versus wild animals and the proportion of cattle versus caprine are very similar between the preliminary assemblage from Cocóspera and that observed at San Agustín. Both missions suggest primary reliance on animal husbandry, particularly cattle ranching, with some continued reliance on indigenous vertebrate resources, supplemented by smaller domesticated livestock.

The predominance of cattle at both Cocóspera and San Agustín contrasts with the pattern at missions observed elsewhere in the southwestern region. At missions associated with the Eastern and Western Pueblos in the northern U.S. Southwest, caprines, particularly sheep, tend to dominate (Chapin-Pyritz 2000; Gifford-Gonzalez 2005; Jones 1997; Moore 1994; Spielmann and Clark 2005; Sunseri 2005; Tarcan 2005). A number of factors may explain this difference. The Puebloan mission contexts tend to date from an earlier context, perhaps suggesting a shift in colonial strategy over time. However, it is perhaps more likely that environmental factors affected the ability of the missions to raise certain kinds of livestock. Reitz found that the environmental requirements of livestock restricted the success of attempts to introduce livestock in the North American Southeast and Caribbean (Reitz 1992). In the North American Southwest, sheep may have been favored over cattle in the cooler northern latitudes. The evidence does not suggest that caprines occurred at a frequency that we would expect if wool was a focus of secondary product extraction. Wool production was an important activity in the northern Southwest region, with an associated highly-developed textile economy. It is likely that any attempts to engage in a wool industry in the Pimería Alta would have run up against both the environmental tolerances of sheep, who perhaps produced less wool in the warmer latitudes, and competition from the already established wool textile industries in the northern Pueblos.

A high degree of fragmentation at both missions suggests that the missionized O'odham were heavily involved in tallow, or grease, processing. As observed above, tallow was used in a number of applications in the eighteenth century, including the manufacture of food-grade greases, soaps, candles, and lubricants. All of these products could have been manufactured at the missions for local use, but likely also tied the missions to a regional economy, where tallow in its rough or finished form was sold to the numerous mining operations found throughout Sonora.

In California, it is noted that cattle ranching was focused on secondary animal product extraction over the use of these livestock for meat (Dallas 1955). While secondary products could be processed for storage and travel, meat would spoil before it could reach the dispersed California markets. In the California mission economy based on secondary saleable products, the vast majority of the meat from cattle was discarded (Dallas 1955). However, such was likely not the case at the two Pimería Alta missions discussed here. Butchering marks on meat-bearing elements were observed in both mission assemblages, indicating that meat was removed for consumption after cattle carcasses were processed for hide. This evidence suggests that herds were exploited both for food, and for secondary animal products.

Conclusions

Analysis of materials from mission San Agustín and preliminary results from mission Cocóspera indicate that, in contrast to research in other areas, animal husbandry was successfully introduced soon, but not immediately, after the commencement of missionary activities. This difference is likely due in large part to ecological factors including, but not limited to, the relative scarcity of large wild game in southwestern versus southeastern North America, and the ability of Eurasian domesticated livestock to adapt to the arid Southwest. This is not to say that hunting did not continue to be an important activity at the mission. Numerous wild animal species are represented at both missions. Indeed, the presence of the remains of wild game in middens within the mission compounds suggests that resident priests not only permitted, but benefited from, these activities.

Both assemblages also indicate that missions played an important role in the growing regional colonial economy. As in Alta California (Dallas 1955), Pimería Alta missions were important sources of raw materials for industry, including hide and tallow. It is therefore likely that subsistence change among the eighteenth-century O'odham was as much commodity-driven as food-driven. Livestock contributed a new source of meat and other edible products for the O'odham; however, it is very likely that the intensification of animal husbandry at San Agustín and Cocóspera was in response to the expansion of regional markets, not for meat, but for animal byproducts.

Mission Cocóspera was located closer to the mining communities in Sonora, and it is possible that this mission more frequently engaged in economic interactions with these colonies. However, evidence for tallow processing was similar at both missions, suggesting equally intensive involvement in this activity. San Agustín was located across the river from the presidio at Tucson, and the mission sold goods to the presidial community. It is likely that both missions responded to local *and* regional demands for livestock and livestock products. Further work, and more in-depth analyses such as stable isotopes, may be able to reconstruct specific exchange routes and mechanisms between missions, presidios, and mining communities in the region.

The Mission San Agustín and Cocóspera assemblages represent only a snapshot in time, and only a first look at the role of animal husbandry at missions in the Pimería Alta. Future research will hopefully yield assemblages that will permit examination of changes in economic practices over time, and that can further elucidate the role of the southwestern missions in the expanding colonial market economy.

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14. The Adoption and Use of Domestic Animals at Zuni

Carmen Tarcan and Jonathan Driver

Excavations at the Middle Village of Zuni Pueblo (Halona:wa) exposed a sequence of deposits that run from pre-contact times to the twentieth century. A large, well-preserved collection of animal bones is dominated by mammals, most of which are from domestic sheep and goat. Domestic animals were being consumed at Zuni immediately after contact with the Spanish and largely displaced domestic turkey and wild smaller mammals from the diet. However, hunting of wild birds and wild large game persisted. We suggest that Zuni people made economically rational decisions to incorporate domestic animals into their economy but maintained their identity as a distinct people by continuing traditional practices of hunting birds and large mammals. Some skeletal elements of wild animals may also have been selected specially. Sheep outnumbered goats by five to one. The age profile of slaughtered sheep and goats shows an emphasis on younger animals, and the zooarchaeological data do not clearly identify the expected importance of older sheep in the wool economy. We suggest that our samples reflect the importance of this location for ceremonial activities and that younger animals were selected for consumption at these events. Limited comparison with other excavated Zuni sites supports the overall importance of sheep and goats in the economy and demonstrates minor variation between assemblages.

Keywords: Zuni; colonialism; sheep and goat; prey choice

Introduction

In the North American Southwest, Native American horticulturalists established numerous village communities, generally known today by the Spanish term “pueblo.” Settlement histories vary from region to region, but there were periods when relatively small communities were scattered over the landscape and times when people tended to aggregate into larger communities. At the time of the arrival of the Spanish in the northern part of the American Southwest in the sixteenth century AD, aggregated Pueblo communities were concentrated along permanent rivers, with the densest populations along the Rio Grande and its tributaries in New Mexico (Cordell 1984). The Zunis lived in relative isolation, about 200 km west of the Rio Grande, with their nearest Puebloan neighbors consisting of the Hopi, about 150 km to the northwest, and Laguna and Acoma about 130 km to the east (Figure 14.1). Between the Puebloan communities were hunter-gatherer populations, notably Apache and Navajo, who had moved into areas vacated by horticultural Puebloan peoples.

The Zuni people today live on a reservation established in the nineteenth century that includes a portion of the land they traditionally used prior to the arrival of the Spanish in the sixteenth century. The Zuni heartland is at an elevation of about 2000 meters in west central New Mexico (Ferguson and Hart 1985). It has supported horticultural communities for thousands of years (Damp *et al*. 2002), and has seen significant cultural changes over the last 1000 years. In this paper we are concerned mainly with the impact of colonial economies and societies on Zuni hunting and husbandry. We deal with data from the currently occupied centre of Zuni life, known as the Middle Village or Halona:wa.

Prior to the arrival of the Spanish, the Zuni region had seen some significant changes in settlement patterns (Kintigh 1985; Stone and Howell 1994). From about AD 1 to AD 1150 most ancestral Zunis lived in hamlets or small villages scattered over the landscape, in close proximity to arable land. From 1150 to 1250 the majority of people moved into large villages, and these were replaced in the next century by more formally organized villages, built around a central plaza. These villages tended to be on mesa tops overlooking the river valleys. At about 1400 there was a significant shift in the settlements, and new villages were constructed on the floodplain of the Zuni River and its tributaries. Six of these major villages were inhabited at the

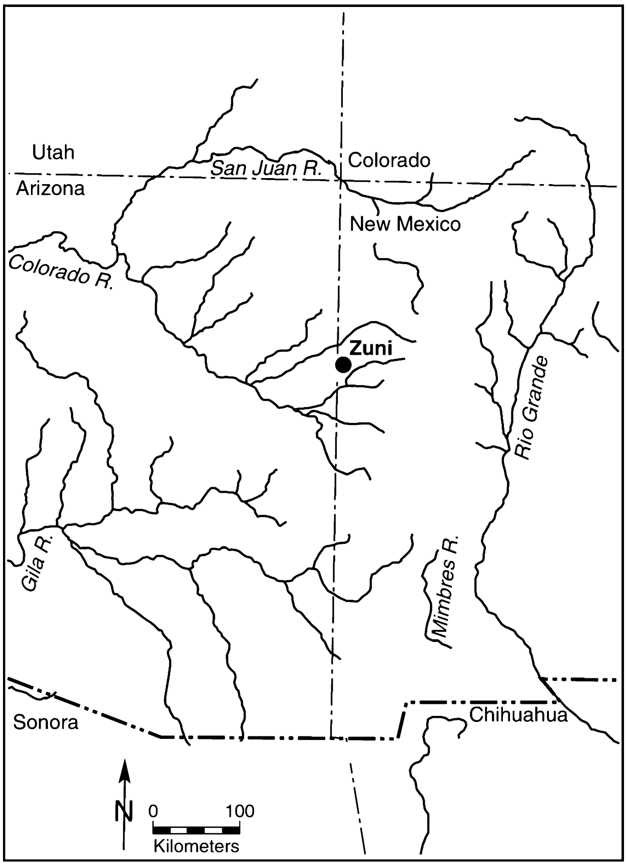

Figure 14.1. Location of Zuni Pueblo (Tarcan 2005).

time the Spanish arrived in 1540. Direct Spanish influence was relatively minor at Zuni, when compared with other areas of the Americas, and resulted in the establishment of two missions, staffed by priests. Following the "Revolt of the Pueblos" in 1680, Zuni villages were temporarily abandoned, and in 1696 the Zuni returned to their homes at Middle Village. In the late 19th century outlying villages were occupied seasonally for agricultural purposes. For part of the 20th century the outlying villages became important residential sites, and Middle Village was primarily a place for ceremonial activities. However, it has now resumed its role as a residential location, and the outlying villages have been largely abandoned.

The design of the Middle Village has changed a lot over the years (Ferguson and Mills 1987). At some periods multi-storied masonry rooms were common; more recently, there has been a reduction in height of roomblocks in many areas of the pueblo, but the concept of rooms clustered around plazas has been a consistent feature of the community since the fourteenth century (Figure 14.2). Two notable series of excavations have been carried out in the village in recent times. We refer to these as the Waterline and Middle Village projects. In the early 1980's construction of trenches for water pipes allowed archaeologists to examine what were mainly colonial period deposits (Ferguson and Mills 1982). Between 1997 and 2001, Zuni Cultural Resource Enterprise conducted excavations in and around Rat Plaza and Small Plaza in the northwest section of the

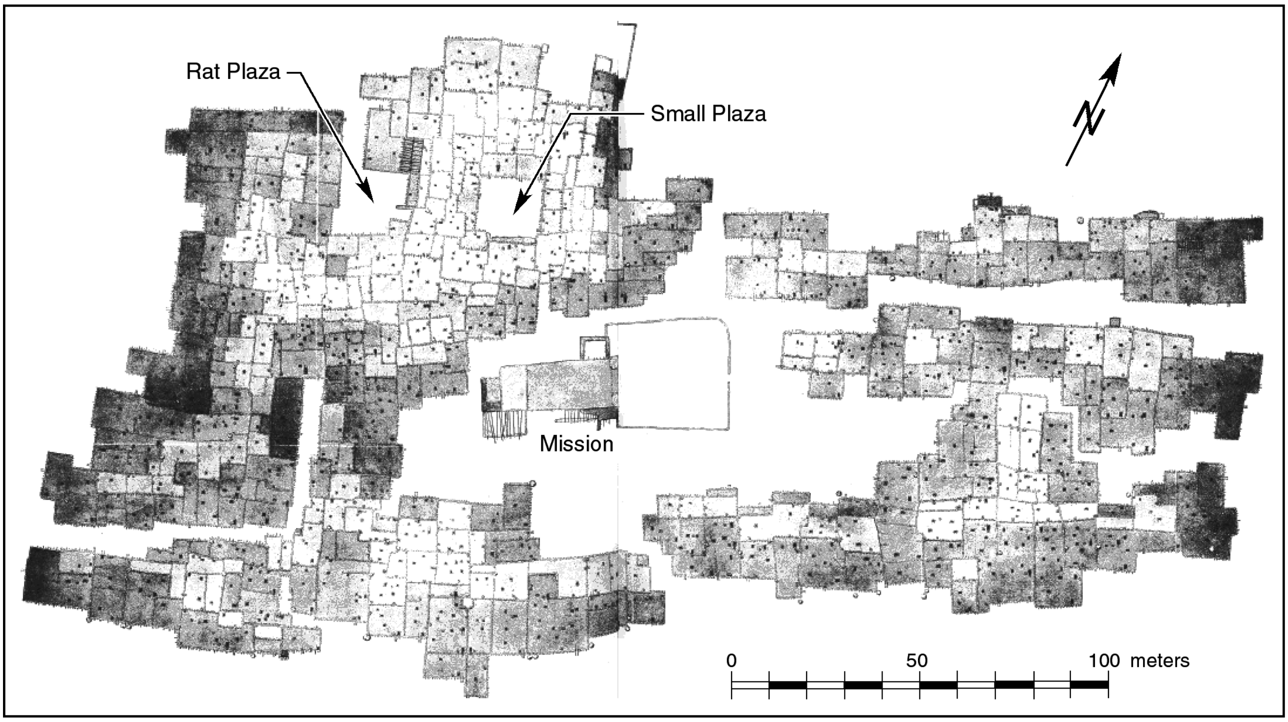

Figure 14.2. Zuni Pueblo in 1881. Middle Village excavations took place around the two small plazas in the northwest corner of the village. Note: lighter shading indicates taller roomblocks. The Spanish Mission is in the centre of the large plaza. Image reproduced from Mindeleff (1891) accessed through Project Gutenberg (http://www.gutenberg.org/etext/19856).

Pueblo, because buildings were being renovated (Nieto and Howell 2001; Howell 2001). Some excavation units reached deposits from the pre-colonial period. Other excavations only sampled colonial period deposits. Overall, the excavations provided samples running from pre-contact times to the twentieth century. In contrast to the Waterline project, where deposits were disturbed by the process of excavating the trenches, the Middle Village project allowed some subdivision of assemblages into time periods. In this paper we report faunal data from the Middle Village excavations, and make some comparisons with faunal data from the Waterline excavations and the outlying village of Pescado (Etnier 1997).

During the Middle Village project, excavation units were distributed through a number of standing buildings, mainly around Small Plaza, with their location determined largely by resource management considerations. Some units were relatively shallow, while others reached the earliest occupations of the site. Sediments were screened through 6mm mesh. Deposits were dated by stratigraphy, by dendrochronology, and by the presence of diagnostic artefacts, notably ceramics. Not all layers in all excavation units could be dated. On the advice of excavators and material culture specialists, we have defined five phases: late prehistoric (AD 1350 to 1450); contact (1450 to 1630); mission (1630 to 1680); post-revolt (1680 to 1800); historic (post-1800). We should emphasize that very significant social and political events occurred throughout this time span, but these events cannot be identified easily in the archaeological record. Following the Pueblo Revolt of the late seventeenth century, New Mexico remained a Spanish colony until 1821, when Mexico became a separate state. In 1846 New Mexico was ceded to the United States. The American military established a fort in the area in 1868, the Zuni reservation was established in 1877, and the first railway arrived in 1881. Throughout this time Zuni people were engaged in realignment of their relationships to colonial states and economies, as well as to other Native American groups. The archaeological record provides a relatively coarse record of changes in Zuni material culture, and it cannot be dated with sufficient accuracy to link it to particular historical events.

Taxon	LP	C	M	PR	LH	ND
White pelican *Pelecanus erythrorhynchos*						1
American bittern *Botaurus lentiginosus*				3		
Mallards and relatives Anseriformes	2	1	5		9	
Vultures, Hawks, Eagles Falconiformes	1		1			
Hawks *Buteo* sp.	4	20			7	9
Golden eagle *Aquila chrysaetos*						6
Falcons *Falco* sp.			1			
Sparrow hawk *Falco sparverius*				15	1	
Grouse Tetraonidae	1					
Turkey *Meleagris gallopavo*	45	8	1	1	7	5
Domestic chicken *Gallus gallus*			1			
American coot *Fulica americana*				1		
Wader Charadriiformes				1		
Owls Strigidae	10				4	
Screech owl *Otus asio*					1	
Great horned owl *Bubo virginianus*	18					
Common nighthawk *Chordeiles minor*					1	1
Woodpeckers Picidae		1		1		
Common flicker *Colaptes cafer*	1					
Perching birds Passeriformes		1		1	1	
Magpie *Pica pica*					1	
Raven *Corvus corax*	4	9	1		5	
Large bird	2	3				15
Medium bird	7	6	1	1	8	3
Small bird				2		
Totals	95	49	11	26	45	40

Table 14.1. Chronological distribution of identified birds, Zuni Pueblo. LP: Late Prehistoric; C: Contact; M: Mission; PR: Post-Revolt; LH: Late Historic; ND: not dated.

Faunal analysis from the Middle Village excavations

Analysis of all faunal remains was undertaken (Tarcan 2005), with about 10,000 specimens identified to taxon and element out of a total of 16,000 specimens. The identified specimens were dominated by mammal (97%) with smaller quantities of bird (2.5%) and reptile (0.5%). Because not all contexts could be dated, trends through time can be assessed on a subsample of 7806 mammal and 226 bird specimens for which the element could be identified, and that could be assigned to a datable context (Tables 14.1 and 14.2).

Before moving to the results of our analyses, we should mention some methodological questions. First, we have been consistent in defining an identified specimen as one for which the skeletal element can be specified (using the rationale defined in Driver 1992). This means that we must be able to identify limb and girdle bones precisely to element, cranial specimens must be identifiable to one or more of the constituent parts of the skull, and vertebrae must be identifiable to the general category (cervical, thoracic *etc.*). We have therefore not followed the practices of some other analysts. For example, splinters of long bones that cannot be identified precisely to element are common finds in zooarchaeological assemblages. Some analysts will assign these to a category such as "large mammal" on the basis of the cortical thickness of the specimen. We would regard these as unidentifiable, because the skeletal element could not be specified.

Taxon	LP	C	M	PR	LH	ND
Rabbits and hares Lagomorpha	1	2				
Cottontail rabbit *Sylvilagus* sp.	247	270	132	73	146	16
Jackrabbit or hare *Lepus* sp.	115	89	137	45	104	6
Squirrels Sciuridae	1	1				
Ground squirrel *Spermophilus* sp.			2	3	8	
Prairie dog *Cynomys* sp.	1	3	10	8	7	
Kangaroo rat *Dipodomys ordii*			1		1	
Pocket gopher Geomyidae		1	2	2	1	
Mice, voles Muridae					1	
Wood rat *Neotoma* sp.	2		37	7	8	3
Small rodent	7	6	10	2	9	
Beaver *Castor canadensis*	1		2			
Carnivore Carnivora				7		
Dog, wolf, coyote *Canis* sp.	7	6	17	85	71	15
Coyote *Canis latrans*				20	2	
Dog *Canis familiaris*				14	3	1
Gray or red fox				2		
Bears Ursidae					1	
Cats Felidae				3		
Lynx/Bobcat *Lynx* sp.		1	3		1	1
Large carnivore (>wolf)					1	
Medium carnivore (>fox)	4	4	15	24	39	8
Small carnivore (<fox)	1	1		6	8	
Horse or donkey Equidae			1	14	1	
Horse *Equus caballus*	3		3	4	33	
Donkey *E. asinus*				5	10	4
Deer *Odocoileus* sp.	9	10	46	24	124	41
Mule deer *O. hemionus*			10		1	
White-tailed deer *O. virginianus*					1	
Bighorn sheep *Ovis canadensis*					1	
Pronghorn *Antilcapra americana*	5	5	45	12	110	25
Sheep *Ovis aries*	57	5	629	202	1087	272
Goat *Capra hircus*	4	1	58	49	235	55
Sheep or goat	14	1	142	68	276	69
Cattle *Bos taurus*	3		1	6	43	13
Pig *Sus scrofa*			1	1	1	3
Deer size artiodactyls	71	32	613	312	1509	354
Cattle size artiodactyls			4	7		3
Large ungulate			6	18	65	14
Medium ungulate	12	19	69	50	304	121
Ungulate			1	1	6	
Jackrabbit size or smaller	1	4	10	5	9	
Deer size or smaller	1	2	112	71	167	26
Larger than deer			1	1	11	5
Total	567	463	2120	1151	4405	1055

Table 14.2. Chronological distribution of identified mammals, Zuni Pueblo. See Table 14.1 for abbreviations.

Second, identification of the artiodactyl specimens poses some special problems. There are five species of artiodactyls in the region with similar body size and morphology:

Odocoileus hemionus, mule deer
Antilocapra americana, pronghorn antelope
Ovis canadensis, bighorn sheep
Ovis aries, domestic sheep
Capra hircus, domestic goat

It is often difficult to identify specimens to species, especially fragmentary specimens, some axial specimens (notably ribs), and juvenile specimens. Every artiodactyl specimen was identified as precisely as possible, but there are still many specimens for which we could identify the skeletal element but could not provide an identification to genus or species. As a result, change in species frequency through time is based primarily on diagnostic areas of the skeleton, such as teeth, crania, and some long bones. We tested our ability to distinguish domestic sheep and goat through ancient DNA analysis. Of 12 specimens selected, all were identified correctly, except for a pelvic fragment that had been identified as sheep but was, in fact, from pronghorn antelope.

A third caution relates to the location of the sample within the village. This area of Zuni is one of the oldest sections of the village, and important ceremonies take place here (Ferguson and Mills 1987). It is therefore possible that the assemblages are not composed of the faunal remains that result from everyday food preparation, but from food consumed at special events.

Taxonomic frequencies

Quantification is based on NISP. Looking first at general trends through time (Tables 14.1 and 14.2), the most obvious change is the introduction of domestic sheep and goat by the Spanish. We do not have documentary evidence for when this occurred, nor do we have details of animal ownership. During the early years of colonization, Spanish pastoralists and, later, the Franciscan missionaries probably controlled the flocks of sheep and their products. The Missions supported themselves by exporting sheep and woolen blankets and knitted stockings made by the Puebloans to mining centres in northern Mexico (Webster 2000, 2003). Although the Zuni grazed flocks of sheep for the Missions after the establishment of the Catholic Mission in 1629–1630, no documentary evidence attests clearly to the ownership of sheep at Zuni Pueblo prior to 1721 (Ferguson and Hart 1985; Hart 1995; Minge 1995). However, Spanish records for the Santa Fe region indicate that in 1639 the Native Americans kept larger numbers of cattle and sheep than the Spanish (Hackett 1937), so it is possible that Zuni people owned and controlled domestic animal populations as early as the mid-seventeenth century.

Sheep and goats outnumbered other introduced domesticates and rapidly became an important supply of meat and wool in the Zuni economy. Large flocks were being bred by the Zuni in 1760 and records mention that the flocks numbered 15,736 sheep by 1779 (Adams and Chavez 1956). The flocks were herded from Zuni Pueblo and the seasonally-occupied villages during the 18th century. By the 19th century the size of flocks doubled and then doubled again by the early 20th century (Ferguson and Hart 1985). Numerous ethnographic and ethnohistoric sources indicate that meat and wool were extracted from the flocks (Crampton 1977; Cushing 1920, 1979; Eggan 1950; Stevenson 1904; Tedlock 1992). Indirect evidence for the increased importance of herding comes from ubiquitous sheep corrals present in the area since Spanish times (Dublin 1998:65).

Our primary research questions therefore concern the timing and impact of the introduction of domestic animals and the way in which Zuni people managed domestic sheep and goat, and can be condensed as the following two questions:

1. When does archaeological evidence show that European-introduced domesticates begin to play an important role in the Zuni economy, and does this support the documentary evidence concerning the use of domesticates?
2. How did the Zuni make use of introduced domesticates? Did they adopt European management practices or develop their own? Was there a transition period? Were domesticates used primarily as a meat source or were other functions (*i.e.* secondary products) relevant? Can temporal changes in the management of domestic animals be detected?

We do not have sufficient stratigraphic resolution or dating to provide a clear picture of the adoption of sheep and goat by the Zuni. However, we do see evidence to suggest a fairly early and rapid change in the animal bone assemblages. As can be seen in Tables 14.1 and 14.2, the late prehistoric period was dominated by lagomorphs, with domestic turkey and wild artiodactyls making up a relatively small proportion of the assemblage. Domestic animals, notably sheep, are present in strata thought to pre-date the arrival of the Spanish. We suspect that this is caused by a combination of factors, including natural and cultural processes that move bones through strata, as well as some imprecision on the part of excavators. The numerical dominance of lagomorphs is typical of pre-contact sites in the region, as is the dominance of cottontail over jackrabbit (Potter 1997, Table 6.15). However, another interpretation of the presence of domesticates in supposedly pre-contact assemblages is that these are in fact the earliest post-contact deposits, and that they lack Spanish artifacts but contain introduced animals. Only further excavation can resolve this.

The Contact period assemblages are unfortunately very small. Lagomorphs are still dominant in these assemblages, and in fact the proportion of domestic animals is lower than in the pre-contact strata. Zuni in the sixteenth and early seventeenth centuries may have had relatively little access to the meat of domestic animals. However, with the permanent presence of Spanish soldiers, priests, and missions in the seventeenth century (the Mission period in Tables 14.2 and 14.3), we see a significant change in faunal assemblages. Sheep and goat dominate the faunal assemblage, and the proportion of lagomorphs declines. Whatever their socioeconomic status in the new colonial arrangement, Zuni people were able to obtain quantities of domestic animals for food. Once established, this pattern continued throughout the post-contact period, and domestic artiodactyls are common in all later assemblages.

Excavation	Domestic	Wild	Total	% wild
Middle Village	3126	479	3605	13
Waterline	1883	112	1995	6
Pescado	295	20	315	6

Table 14.3. Wild and domestic artiodactyls from three Zuni excavations.

This conclusion in itself is interesting for a number of reasons. First, optimal foraging theory suggests that large mammals should be preferred prey items for people using terrestrial environments, and worldwide ethnographic data generally confirm that large mammals, both wild and domestic, are highly desired and have been exploited intensively (*e.g.* Robinson and Bennett 2000; Grayson 2001). In pre-contact times artiodactyls were hunted by the Zuni (Potter 1997), but in much lower proportions than the overall use of artiodactyls in the seventeenth century and later. Once domestic artiodactyls became available, they were a preferred food item, and the relative importance of lagomorphs declined.

One would expect that the use of all hunted game would decline with the introduction of domesticates, but this is not the case. The use of wild artiodactyls seems to increase slightly when sheep and goat were introduced, and wild artiodactyls, mainly deer, remain a consistent part of the faunal assemblages at all time periods. Although it is possible that shepherds had opportunities for deer hunting at more remote sheep camps, we believe that the persistence of deer hunting was based on cultural considerations. Hunting large game is one of the defining attributes of being male in Puebloan society (Szuter 2000), and wild game played an important role in many ceremonies. To test this hypothesis we compared the use of wild game from the ceremonial center of Zuni with its representation in the waterline excavations that sampled a much wider range of neighborhoods in the Middle Village (Olsen 1982) and with the percentage of wild game in an outlying farming village (Etnier 1997). In both cases, there were lower frequencies of wild artiodactyls than at the ceremonial center (Table 14.3), and this supports the suggestion that it was the social and ceremonial use of wild artiodactyls that caused long-term persistence in hunting.

Further support for the continuation of hunting for social and ceremonial purposes comes from the avian data. As with many Puebloan sites, not all bird taxa reflect hunting for food. The assemblages from Zuni are dominated by birds of prey, especially hawks, owls, and the raven (Table 14.1). Examples of these occur in all time periods, suggesting persistent beliefs about these species and a continued need to obtain feathers from them. Roscoe (1989) analyzed the feathers used on costumes worn by participants in Zuni *kachina* ceremonies. (*Kachinas* are supernatural beings who live outside the village and bring rain when people engage in dances while wearing costumes that represent the *kachinas*). He lists the following kinds of birds whose feathers were used: eagle (likely *Aquila chrysaetos*), macaw, duck, sparrow hawk (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), sandhill crane (*Grus canadensis*), owl, turkey (*Meleagris gallopavo*), bluejay (probably the scrub jay *Aphelocoma coerulescens*), and crow (Corvidae; possibly common crow *Corvus brachyrhynchus* or raven *Corvus corax*). Table 14.1 shows that the Middle Village assemblage contains a number of species that could have supplied feathers for these costumes. In addition, feathers were also needed for prayer sticks that were placed in the ground when a prayer was offered, and feathers were also placed on altars (Tyler 1991). The Middle Village bird list is very similar to lists from late prehistoric sites in the Zuni area (Potter 1997, table 6.20).

Another prediction of optimal foraging theory is that the introduction of a new prey item will lead to the dropping of a lower ranked item. At Zuni, domestic turkey virtually disappears with the arrival of domestic artiodactyls. At prehistoric sites, about 15% NISP is turkey (Potter 1997), and NISP for turkey usually exceeds NISP for artiodactyls. In the late prehistoric Middle Village, turkey is not as well represented when compared to lagomorphs as at prehistoric sites, but it does exceed NISP values for wild artiodactyls. Once domestic artiodactyls were introduced to Zuni, turkey is barely represented in assemblages.

Bearing in mind the problems of stratigraphic resolution, our data suggest that sheep and goats became common in the Zuni economy by the mid-seventeenth century, following the establishment of a permanent Spanish presence in the area. Regardless of sociopolitical changes, these domesticates dominated the Zuni economy until the late twentieth century. Hunting of lagomorphs seems to have declined after the introduction of European domesticates, and the use of domestic turkey almost completely ceased. Hunting of wild artiodactyls, notably deer, seems to have increased in importance relative to hunting smaller game. Some hunting of lagomorphs continued, as did acquisition of wild birds.

These observations support the concept that the process of colonization and acculturation is complex. Zunis obviously recognized the economic value of sheep and goats, and they used these new species not only for subsistence, but also as a way of interacting with the world beyond their borders. On the other hand, they retained some traditional economic practices, such as trapping lagomorphs, hunting deer, and capturing or killing wild birds.

Age	Sheep	%	Goat	%	Total	%
2–6 mo	7	16	0	0	8	9
6–12 mo	6	14	9	23	16	18
1–2 yr	15	34	10	26	26	29
2–3 yr	2	5	3	7	5	6
3–4 yr	4	9	7	18	13	15
4–6 yr	5	11	4	10	10	11
6–8 yr	3	7	3	7	6	7
8–10+yr	2	5	3	7	5	6

Table 14.4. Age at death of sheep and goat, based on Middle Village mandibles. Age classes are derived from Zeder (1991: table 9). Total is sum of sheep, goat and sheep/goat.

Husbandry and processing

We now turn our attention to the management of domestic artiodactyls. At all time periods domestic sheep outnumber domestic goats. In the Mission period the sheep to goat ratio was about 10:1, and thereafter it was about 5:1. The intrusive sheep and goat in pre-contact deposits also have a ratio of about 10:1, supporting the idea that early contact period assemblages were responsible for most of the intrusive specimens in the prehistoric component. Other domesticates include cattle, pig, horse and donkey. These are rare in pre-Contact and Contact periods, and are only a small percentage of the total domestic assemblage. Horse and donkey consistently outnumber cattle and pig.

When we analyze age-at-death of sheep and goat, we are faced with some methodological problems. We can identify specimens to species and provide age-at-death estimates on the basis of teeth. Unfortunately the sample size is rather small, which makes accurate assessment of change through time difficult. Larger samples can be achieved by looking at the state of fusion of skeletal elements, but here we are faced with the difficulty of species identifications of immature specimens that tend to have fewer diagnostic landmarks. Because medium-sized domestic artiodactyls are so common, we assume that most of the medium-sized artiodactyls that cannot be identified to the genus or species level are also from domesticates. While such an approach must involve some inaccuracy, it is the only way we can incorporate immature post-cranial remains into our analysis.

Eighty-nine mandibles were available for ageing, of which 44 were assigned to sheep and 39 to goat. Using a method described by Zeder (1991), we divided the mandibles into age stages. Mortality profiles for the two genera are reasonably similar (Table 14.4) and show that animals in the Middle Village were most often killed at the end of the first year and during the second year. This pattern is more pronounced in later periods and less obvious in the Mission period, perhaps suggesting that a more specialized economy developed over time (for details see Tarcan 2005).

Data from bone fusion (Table 14.5) do not allow us

Fusion Group	MF	MU	%F	PRF	PRU	%F	LHF	LHU	%F
1	50	12	80.6	27	1	96.4	158	36	81.4
2	204	60	77.2	51	18	73.9	230	121	65.5
3	81	92	46.8	22	42	34.3	121	228	34.6
4	29	68	29.8	14	45	23.7	104	324	24.2

Table 14.5. Fusion data for all medium artiodactyls, Middle Village project, from Mission, Post-Revolt, and Late Historic periods. Fusion groups defined in text. F = fused; U = unfused. M = Mission; PR = Post-Revolt; LH = Late Historic.

Age	Middle Village	%	Waterline	%	Total	%
2–6 mo	8	9	1	2	9	7
6–12 mo	16	18	5	10	21	15
1–2 yr	26	29	16	33	42	31
2–3 yr	5	6	4	8	9	7
3–4 yr	13	15	14	29	27	20
4+ yr	21	24	8	17	29	21

Table 14.6. Comparison of sheep, goat and sheep/goat mandibular ages from Middle Village and Waterline excavations. Due to variation in methods, ages greater than 4 years are compressed into a single category.

to examine individual taxa, so here we lump together all medium-sized artiodactyls, recognizing that a small proportion of them must be from wild animals. We defined four fusion groups from earliest fusing to latest fusing: Group 1 at approximately 6 to 10 months (scapula glenoid, distal humerus, proximal radius); Group 2 at approximately 13 to 16 months (proximal first and second phalanges); Group 3 at approximately 18 to 28 months (distal tibia, distal metapodial, proximal calcaneus); Group 4 at approximately 36 to 42 months (proximal and distal femur, distal radius, proximal ulna, proximal tibia, proximal humerus). As one would expect in an assemblage with good preservation, there is a negative correlation between percentage of elements fused and age at which fusion occurs. About 30% of specimens indicate survivorship beyond four years, and this is reasonably consistent with data from mandibles.

Overall, the age distribution is most consistent with decision-making in an economy where meat production was the primary consideration. Munson's (2000) model mortality profiles suggest that both a wool economy and a milk economy would have a more strongly bimodal mortality pattern, whereas a meat economy would favour the slaughter of younger animals. If this interpretation is correct, we should ask what happened to the two-to-three year old animals. One possibility is that animals of this age were the most marketable, and these may have been selected by the missions for tribute or by the Zunis themselves for export to the American economy in later periods. Another problem is that we know that Zunis kept flocks for wool, but this is not reflected particularly well in the age distributions. We suspect that this is because the assemblages are the result of slaughtering animals for ceremonial events, when younger animals were preferred. Olsen's (1982) analysis of sheep and goat dentitions from the Waterline Project sampled a wider area of the Middle Village. She did not use the same method as we did, and she does not provide detailed descriptions of tooth wear stages. However, we can make some comparisons between the two samples (Table 14.6). When compared to her analysis, material from our study shows a higher percentage of animals slaughtered in the first year and a smaller percentage in the third year. It is possible that the good representation of young animals in our assemblages is due to excellent preservation. However, if young animals are excluded, then the third year animals are still well represented in the Waterline sample, but older animals are not as well represented as in the Middle Village project assemblages.

If we combine our samples and Olsen's samples (Table 14.6) we still see a strong emphasis on slaughter of younger animals, with a definite lack of animals in the 2 to 3 year range. We interpret this pattern as resulting from keeping flocks for a mixed meat and wool strategy, with a preference for younger animals to be used in the main settlement. Animals greater than four years in age are not as well represented as most models would predict. Unfortunately, ageing data are not available from any outlying villages, so it is not possible to ascertain if older animals were slaughtered and consumed at those sites.

Body part frequencies seem to be affected mainly by density-dependent taphonomic agencies. Generally speaking, when all artiodactyl specimens are considered, there is a reasonably good correlation between element frequency and bone density. The two exceptions to this are an underrepresentation of the distal ulna and an overrepresentation of scapula. Distal ulna is relatively small, and the distal ulna also fuses late, so it is possible that some specimens were not recovered. The high frequency of scapula is notable when all medium-sized artiodactyl specimens are combined, but it appears to be the result of overrepresentation of scapulae from wild artiodactyls that causes the distinctive peak in scapula numbers. It is possible that this results from selection of the scapula of wild animals for a special purpose, such as the manufacture of scapula rattles, known to have been used in Zuni ceremonies.

Analysis of butchery patterns shows a significant reduction in the percentage of bones with butchery marks through time. We analyzed the frequency of cutmarks on joints. In the Mission period about 15% of specimens had cut marks, but this declined to 7% by the late historic period. Similar trends can be seen in the numbers of meaty bones with cutmarks. In the Mission period 32% of scapulae and 17% of meaty limb bones exhibited cutmarks, and these percentages declined to 17% and 7% in the late historic period. This may relate to a change of cooking methods, with larger pieces of meat being stewed in large metal vessels in the later time periods, thus requiring less butchery prior to cooking. Although Anglo-Americans used saws to butcher carcasses, there is little evidence for this at Zuni. There is no sawn bone in the Mission period, and less than 1% of all artiodactyls bone is sawn in subsequent periods. Clearly, Zuni did not adopt Anglo-American butchery practices on domestic animals consumed for their own purposes.

Conclusions

In adopting sheep and goat, Zunis made rational choices about their food supply, based on optimization decisions. Similar considerations affected their decision to abandon the raising of domestic turkey and to reduce their use of small game. On the other hand, the desire to maintain their own identity in the face of colonial forces led them to retain deer hunting and the capture of wild birds with important symbolic meanings. It is also possible that they favoured wild mammal scapulae for manufacture of certain ceremonial items. They also retained traditional methods of butchery, but it is possible that cooking practices changed, resulting in a reduction in the frequency of cutmarks on the bones of artiodactyls.

The analysis of age-at-death data was not conclusive. With the exception of the earliest period of domestic animal use, Zunis seem to have favored the slaughter of relatively young animals, suggesting an economy oriented more towards meat production than wool production. We suspect that this may be partly the result of sampling an area of the village where animals were often consumed in meals associated with ceremonial activity and where younger individuals were preferred.

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15. "Romanizing" Ancient Carthage: Evidence from Zooarchaeological Remains

Michael MacKinnon

"Romanization" is a controversial and complex issue, which has been historically addressed from a variety of angles: "civilizing" barbarians in a one-way process; fusion or syncretism of different cultures; "nativist" resistance and identity assertion; elite-driven and motivated changes to provincial societies; and more recently, "creolization" of cultural groups. Using zooarchaeological evidence, this paper discusses the effects of "romanization" on aspects of animal production and consumption in North Africa, specifically in and around the city of Carthage.

As concerns husbandry and diet, zooarchaeological data from North Africa indicate a continuation of much of the pre-Roman focus on ovicaprids, with the exception of large urbanized centers like Carthage. Here, demand for pork and other elite or preferred meats (including lamb and hare) in a city with a burgeoning "romanized" economic and social component brought significant changes to husbandry operations. The suburban hinterland around Carthage was somewhat modified to capitalize on meat production, often forcing the original pastoralists to migrate to more distant lands. As Roman influence waned in Late Antiquity, these suburban pork and choice-meat farms became too expensive to maintain and the hinterland zone reverted back to agricultural and pastoral fields.

While "romanization" modified pastoralism in North Africa, wool and hide processing still remained important for cities. Other key animal industries at this time included garum or fish sauce production, and bone handicraft operations. The situation for changes in all of these operations within Carthage over the course of antiquity is also examined, with potential locations identified on the basis of recovered zooarchaeological remains.

Keywords: Romanization, Carthage, zooarchaeology, diet, animal husbandry, ancient economy

Introduction

The ancient Romans were perhaps the greatest colonizers of antiquity. At its height, the Empire spanned across Europe, North Africa, and the Near East, and encompassed numerous cultural groups within this area. While the term "romanization" has typically been coined to refer to the impact of Roman traits and values on the indigenous populations across the Empire, the concept itself has been the subject of considerable debate over the years. How exactly should "romanization" (which in large part is essentially "colonization") be defined and explained? Scholars have addressed the issue from various directions, which in turn have evolved over time, coincident with shifting theories and paradigms. Some have argued that "romanization" acted as a means to "civilize" barbarians (*e.g.*, Haverfield 1923; Brunt 1976). Other saw it as an elite-driven mechanism to maintain identity and exert control (*e.g.*, Millet 1990; Woolf 1998). Still others concentrated on the reciprocal cultural exchange between "Romans" and "natives" – "romanization" as a two-way street, so to speak (*e.g.*, Mattingly 1997). More recently, arguments incorporating anthropological aspects of "creolization" or blending of cultural traits have been used to define and examine the process of "romanization" (*e.g.*, Webster 2001).

While the debate continues, in great measure, any definition and assessment of "romanization" hinges first upon recognizing and describing its traces in the archaeological, iconographical, and ancient literary record. Such an investigative process, however, is also fraught with numerous challenges. Where to begin? What cultural or human characteristics should be examined? What about changes brought to the natural or physical world as a factor of "romanization"? And, how do these cultural and natural domains interact to complicate the picture? The situation is inevitably complex, but nonetheless a necessary path to traverse, despite its multitude of known and unknown twists, turns, and pitfalls.

Diet is one factor that often changes as a result of cultural contact or colonization. We need only look at our contemporary world to note the impact of various ethnic cuisines, many of which flow in and out of favour depending upon cultural demand. A decade ago in many parts of the western world, for example, most sushi restaurants were restricted to Asian market areas; now they appear on practically every street in many western cities. As another illustration of dietary change, I suspect many people a century ago were less inclined to experiment with spices in cooking, until global travel and trade broadened, exposing more individuals, worldwide, to various culinary dishes and ethnic food fare.

Certainly, "romanization" acted similarly in exposing cultures to different behaviours, traits, and goods. And in much the same way one might link "chopsticks" with an Asian influence, or "pizza and pasta" with Italian cuisine, at a similarly basic level, we tend to associate an increase in pork consumption with the concept of "romanization." Pork, at least in Roman Italy, the core of the Empire, was praised as a prized meat, forming the basis of many gourmet and basic recipes. It was generally the meat of choice in Italy, even distributed as free rations to the public of Rome at one point. Moreover, it is among the most common meat ingredients in the recipes of the ancient Roman author Apicius (Flower and Rosenbaum 1958). Such a generalization of pork consumption and Roman ideals helps simplify the process of tracing "romanization." Nevertheless, while an increased frequency of pigs, relative to other domestic livestock, often coincides with "romanization" in many areas of the Roman Empire, the situation is much more complex, and marked by a large degree of regional and temporal variation, itself under the sway of numerous cultural and natural factors. Using zooarchaeological evidence, this study examines the process of "romanization" on animal resources and meat diets in ancient Carthage, North Africa. The city was one of the first of the major Mediterranean centers to be taken over, and subsequently shaped by the Romans. An argument is made that while some larger generalized "Roman Italian" patterns of meat consumption and animal use sweep across Carthage and its hinterland as a result of "romanization," regional variability remained a dominating cultural force here. Although, in a general sense, such an argument is not new, what is lacking from an investigation of the topic is a more detailed examination of the range and interconnectedness of changes in animals and animal resources that resulted from Roman contact in Carthage. In other words, there is a degree of texture missing from this picture that needs to be explored. In turn, the hope is that the patterns displayed here for Carthage may help in deciphering and explaining zooarchaeological trends in other Roman provinces.

Collectively, ancient Roman sites provide a huge osteological database, thereby supplying a chance to conduct larger zooarchaeological syntheses for many areas of the Empire. Anthony King (1999) published one such synthesis. Although he covers the entire Empire, most of King's data derive from the northern provinces, especially Britain and Gaul. At the time of his investigation, he commented that North Africa lacked sufficient zooarchaeological reports to provide a detailed picture of economic and dietary change (King 1999, 87). More recent analyses of faunal samples from Carthage, however, furnish a good opportunity to build upon King's research and examine the effects of "romanization" in greater depth for this key North African city and its hinterland. Carthage, then, can act as a good case study of "romanization," "colonization," "colonialization," or "cultural change" (whatever one wishes to designate it) at a single North African site.

Carthage provides an exceptional circumstance to examine "romanization" in a zooarchaeological sense too, given that it is also an area where a number of key faunal samples were retrieved. Potentially then, Carthage can aid in a larger-scale reconstruction of animal use in a North African urban context. How did animals and their products factor into the realms of production and consumption within this city? And how did these contributions change over the course of antiquity? These questions form the basis of investigation here.

Carthage: Archaeological Sites and Excavation Work

The ancient city of Carthage is located in northern Tunisia, near the modern capital of Tunis. Carthage has had a long history, with urban development spanning back into the early Phoenician or Punic period (*ca.* 8th–2nd centuries BC) and continuing through the Roman era, and beyond into Vandal, Byzantine, and Islamic times. It is arguably one of the more important urban centers of the ancient world, and a dominant city for the Maghreb region of North Africa in particular.

Before considering the zooarchaeological data from Carthage, however, it is important to contextualize the assemblages to understand the biases underlying each. The city was the focus of considerable archaeological excavation during the UNESCO Save Carthage Campaign in the 1970s and 1980s, and then again in the 1990s and early 2000s with a number of "second-generation" projects. Nevertheless, despite the potential for zooarchaeological investigation from all this activity, animal bones were not always retrieved from these ventures, and when collected, techniques of recovery varied among sites, and even within contexts at individual sites. Moreover, zooarchaeological standards in analysis have changed over the years, with the result that some of the earlier publications from UNESCO-sponsored projects lack the detailed statistics and analyses now commonplace in current reports. Consequently, comparisons among these various reports, although essential in deciphering patterns of animal use in Carthage, must understandably be cautious and preliminary in nature.

Figure 15.1 locates the sites in Carthage with available

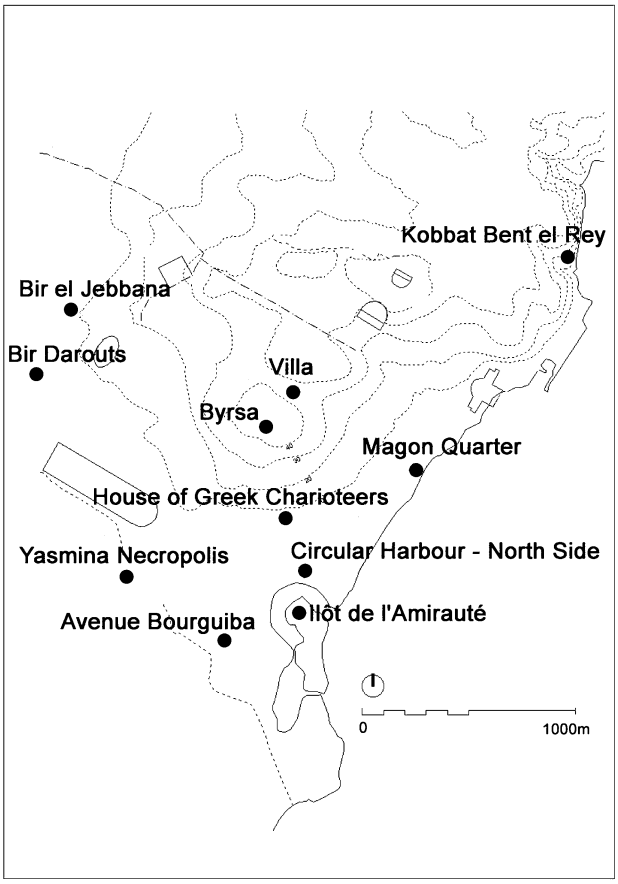

Fig. 15.1. Ancient Carthage. Location of sites with zooarchaeological samples.

zooarchaeological data. Although a sizeable portion of the inner city has been excavated (including the theatre, Odeon, Antonine Baths, and other spots), most of the larger faunal assemblages from Carthage derive from peripheral areas, such as Bir el Jebbana (a suburban bath and basilica complex near the amphitheatre – Canadian project), Yasmina (a Roman cemetery – American project), Kobbat Bent el Rey (in the NE corner – Danish project), Avenue Bourguiba, Salambo (in the South – British project). Fairly significant samples, however, were collected from excavations within the city as well, including the Ilôt de l'Amirauté (the island inside the Circular Harbour – British project) and several cisterns at the House of the Greek Charioteers (American project). Smaller assemblages derive from excavations on the Byrsa Hill (French project) and at a neighbouring villa (Swedish project). Spatially, therefore, the best samples are not directly associated with the forum or inner city markets or shops, but relate to sections somewhat removed from the central core, and in some cases outside the city walls.

Temporally, deposits from the collective group of sites in Figure 15.1 generally span from Punic to Byzantine times (roughly from about the 4th century BC to the 7th century AD), although some contexts post-date these latest levels as well. These Islamic period samples, however, are excluded in this analysis, which concentrates on changes from Punic to Roman to Vandal and Byzantine times. Nevertheless, a temporal bias also exists among the zooarchaeological data. As shown in Table 15.1, most of the contexts that yielded animal bones post-date the Roman period. These Vandal and Byzantine deposits also record significantly larger assemblages than any other temporal phase. Punic and Roman zooarchaeological samples, by comparison, are very small, with one exception, those levels in the UNESCO German-sponsored Magon Quarter excavations. To some extent these increased sample sizes correlate with relatively larger and more extensive excavation projects, but this is not always the case. Ignoring the Magon deposits, Roman faunal remains are generally under-represented regardless of context. While this dearth of Roman materials contrasts markedly with the significant construction campaigns and elevated population levels in Carthage during Roman occupation, it is somewhat expected. Rubbish was likely removed more regularly from the city during Punic and Roman times and deposited in outlying areas, presumably beyond the immediate suburban region too, which was more heavily built-up during those periods. As the city declined through Late Antiquity, rubbish accumulated in abandoned buildings, disused cisterns, and other convenient dumping grounds both within, and immediately outside, the city (Leone 1999, 122–123). Late antique, Vandal, and Byzantine fill deposits at the sites of Bir el Jebbana, Bir Darouts, and the Yasmina necropolis produced some of the largest faunal assemblages from Carthage, a strong indication of the volume of rubbish deposited in fairly convenient dumping grounds outside of the city. Pits were also dug to contain trash, a number of which are recognized from Vandal and Byzantine times on the Ilôt and elsewhere. Consequently, much of the material culture (and especially the animal bones) that has been excavated from Carthage derives from fill levels associated with Vandal and Byzantine occupation times, even if structurally and architecturally there is more evidence for earlier phases in the city.

Even with the temporal and spatial biases to the faunal database from Carthage, enough earlier samples are available to develop general trends for the "romanization" of the city. To understand if these are real cultural trends (from true human impact) or simply a matter of general taphonomic trends over time (independent of cultural variables), pre-Roman (*i.e.*, Punic, here designated roughly as 8th to 2nd centuries BC) and post-Roman (*i.e.*, combined Vandal and Byzantine levels, here denoted roughly as 5th and 6th centuries AD) contexts are used for comparison with the Roman levels (roughly, 2nd century BC to 4th century AD) in subsequent data analyses and figures.

Domestic Mammals, Diet and Animal Husbandry

Regardless of period, as shown in Table 15.2, domestic mammals predominate in all assemblages at Carthage. Wild mammals are practically absent. The Roman peak of 0.7% wild mammals, although insignificant in the overall diet for that period, is still a 7-fold increase since Punic times. There is very little forested land around Carthage for wild

PERIOD – SITE	DATE	NISP	% cattle	% s/g	% pig	REFERENCE
PUNIC						
Magon	Punic	1504	43.4	46.6	10.0	Weinstock 1996
Ilôt de l’Amirauté	IVb–IIb	131	25.2	64.9	9.9	MacKinnon, in prep.
Magon Quarter	Middle–Late Punic	1159	48.1	38.3	13.5	Nobis 2000
Byrsa-PUNIC 1977	II – Punic	84	20.2	40.5	39.3	Poulain 1982
Byrsa-PUNIC 1978	II – Punic	72	41.7	43.0	15.3	Poulain 1982
ROMAN						
Ilôt de l’Amirauté	Ic–1a	62	19.4	33.9	46.8	MacKinnon, in prep.
Circular Harbour – harbourside	I–1	53	24.5	9.4	66.0	Levine 1994
Magon Quarter	Roman (1c–4)	3727	14.1	44.7	41.2	Nobis 2000
Circular Harbour – harbourside	1–4	102	17.6	50.0	32.4	Levine 1994
Ilôt de l’Amirauté	2–5	105	21.0	38.0	41.0	MacKinnon, in prep.
Magon	Roman	96	35.0	52.0	13.0	Weinstock 1996
House of the Greek Charioteers	Roman	294	17.0	52.7	30.3	Reese 1977
VANDAL/BYZANTINE						
Kobbat Bent el Rey	4b–7	3769	4.7	46.0	49.3	von den Driesch and Baumgartner 1997
Cistern 1977.1 (lower level)	5b–c	2142	2.1	54.2	43.7	Reese 1981
House of the Greek Charioteers	5b–6a	60	1.7	58.3	40.0	Reese 1977
Circular Harbour – harbourside	5–6	166	16.3	31.9	51.8	Levine 1994
Bir Darouts	5c–6a	127	2.4	65.4	32.2	MacKinnon, in prep.
Ave. Bourguiba (Group I)	5c–6b	2304	1.7	62.7	35.5	Schwartz 1984
Cistern 1977.3 (upper level)	5c–6c (Vandal)	489	6.7	51.7	41.5	Reese 1981
Ave. Bourguiba (outside walls)	5–7a	2067	0.6	75.1	24.3	Schwartz 1984
Ilôt de l’Amirauté	5c–7 (Vandal/Byzantine)	1885	7.9	59.3	32.8	MacKinnon, in prep.
House of the Greek Charioteers	Vandal to Byzantine	369	1.1	62.6	36.3	Reese 1977
Magon Quarter	Vandal/Byzantine (5–7)	329	21.3	42.6	35.8	Nobis 2000
Circular Harbour – harbourside	6–7	221	3.6	66.1	30.3	Levine 1994
Cistern 1977.2	6c–7a (Byzantine)	1234	0.5	55.8	43.8	Reese 1981
House of the Greek Charioteers	6c–7 (Byzantine)	112	6.3	65.2	28.6	Reese 1977
Ave. Bourguiba (Group II)	6b–6c	469	1.1	63.3	35.6	Schwartz 1984
Ave. Bourguiba (Grp. III & IV)	7a–7b	874	1.3	66.1	32.6	Schwartz 1984
Ecclesiastical Complex	7b–c	1066	2.0	64.0	34.1	Reese 1977
Yasmina – combined levels	Late Roman & Byzantine	2302	9.6	46.6	43.8	MacKinnon, in prep.
Bir el Jebbana – combined levels	Roman & Byzantine	5971	8.3	53.3	38.4	MacKinnon, in prep.
Villa (Swedish excavation)	Late Antique	only birds & fish reported				Large 2001

– DATE: Roman numerals = centuries BC; Arabic numbers = centuries AD; the letters ‘a’, ‘b’ and ‘c’ refer to ‘early’, ‘middle’ and ‘late’ respectively.
– s/g = sheep/goat

Table 15.1. NISP data of principal domestic mammalian taxa for zooarchaeological samples in Carthage, by temporal period.

Period (sample size)	Domestic	Wild
Punic (n=5)	99.9	0.1
Roman (n=7)	99.3	0.7
Vandal/Byzantine (n=19)	99.4	0.6

Table 15.2. Carthage: NISP frequencies for domestic and wild mammalian taxa across sites, by temporal period.

Period (sample size)	Cattle	Sheep/goat	Pig
Punic (n=5)	34.1	47.0	18.9
Roman (n=7)	21.4	40.1	38.5
Vandal/Byzantine (n=19)	4.7	58.1	37.2

Table 15.3. Carthage: NISP frequencies for principal domestic taxa across sites, by temporal period.

animals to inhabit naturally, and what was once there was probably destroyed very early on as agriculture expanded, especially during Roman times. The faunal data cannot confirm if wild animals from outside of Africa were shipped to Carthage, although this seems doubtful, since few could be effectively transported alive in this manner. Within North Africa, boar and deer could have been imported from the Atlas mountain regions to the west. Improved transport mechanisms, under relatively peaceful social and political circumstances may have promoted trading ties to these outlying areas. However, suburban farms around Carthage may have capitalized on the urban demand for wild game by diversifying their stock, through aviaries, small wild game preserves, and most especially warrens for rabbits and hares. Hares constitute the single most important wild animal taxon for Roman levels in Carthage, and could have been easily managed as a peripheral commodity alongside other livestock and crops on suburban mixed farms. Also noteworthy is that Roman contexts see the broadest diversification of bird and fish species in the Carthaginian diet as well, compared to Punic levels. Clearly, the faunal data support an increased segment of elites in the city at this time, a social class cognizant of the importance of conspicuous consumption and gourmet foods, and with significant clout to shape the nature of animal husbandry operations in the Carthaginian hinterland.

Within the domestic mammal category, proportions of cattle, sheep/goats, and pigs at Carthage vary temporally. As shown in Table 15.3, average NISP frequencies for cattle drop progressively from a high of 34.1% in Punic times to a low of 4.7% in Vandal/Byzantine contexts. Available age data reveal a predominance of adult cattle in the Punic examples, but a mix of ages, including young calves, in the Roman contexts. Such a pattern suggests a change from somewhat nomadic herding of cattle in Punic times, where calves were raised to adulthood and maintained as status and wealth indicators to some degree, to a market- and agriculturally-oriented system in Roman times, where oxen were exploited as working beasts, superior brood stock were reared, usually in small localized herds on quality pasture land, and any surplus calves were sold to urban markets. By Vandal and Byzantine times, cattle were not required in this fashion (or became too expensive to maintain – probably because quality pasture lands had deteriorated and dried up) and the data support an increase in established practices of sheep and goat pastoral herding, with a dramatic drop in cattle NISP frequencies.

The typical North African scrub landscape is most conducive for sheep and goats, so it is no wonder that these taxa dominate faunal assemblages from all periods. There is some fluctuation in average frequencies, however, as shown in Table 15.3. Values for this taxon drop from 47.0% to 40.1% from Punic to Roman times, but reassert a high prominence during the Vandal/Byzantine period, surging to 58.1%. In large measure the increase in sheep/goat pastoralism during this last phase comes at the expense of cattle husbandry, which, the data show, declines significantly at this time. Sheep largely predominate over goats among Punic and Roman levels at Carthage (upwards of 10–15 times), but ratios are reduced to about 4 sheep to every goat during Vandal and Byzantine phases. Wool exploitation, shifting cultural dynamics, and environmental changes seem to be the chief factors underscoring flock ratios and ages. As regards the sheep/goat ratio, the decline in cattle (and concomitant net loss of cow's milk), coupled with the increasing degradation of the North African landscape, promoted the herding of goats, since they produce more milk than sheep, and survive better in rougher pastures. The drawback is that goat hair is inferior to sheep's wool. This may not have been a major concern in Late Antiquity, but the demand for wool, on top of an augmented market requirement for lamb, mutton, and quality ewe and ram brood stock significantly shaped pastoral operations during the Roman era. Available data for sheep and goats suggest slight age peaks separated by about 12 month intervals, which might indicate an annual cull of flocks for Carthage. This would support the notion of some transhumant or seasonal rounds in herding, with flocks congregating near the city probably in the winter or spring, outside of harvesting seasons. However, the presence of a wider range of age brackets overall in the Carthaginian data, regardless of period, confirms that some flocks were kept throughout the year in the immediate hinterland. These were not transhumant flocks, but localized smaller herds, presumably incorporated into mixed farming and herding operations around the city.

As recorded in Table 15.3, the frequency of pigs at Carthage doubles between Punic and Roman times (from 18.9% to 38.5%) and remains relatively high at this augmented amount during Vandal and Byzantine phases. This pattern is fairly consistent among all Roman sites in the city, regardless of function, so it appears to be culturally motivated, as would result from large-scale dietary changes. It is only in subsequent Islamic levels of the 9th, 10th, and 11th centuries AD that religious taboos against pork consumption register in the faunal record, and the frequency of pig bones plummets to near zero (MacKinnon, in press). Elevated levels of pork in the ancient diet tend to be linked to concepts of "romanization," and it seems logical to argue such is the case here. However, providing pigs to Roman Carthage would have modified the agricultural schemes in the city's hinterland as well. Two principal types of operations were possible. Farms closer to the city could have capitalized on the urban demand for tastier, younger piglets (which fetched higher prices), and practiced a bi-annual breeding scheme to produce as many surplus piglets as required. This option, however, would only be available to sufficiently wealthy and prosperous farmers who could afford to grow or purchase the necessary fodder for these pigs on otherwise prime suburban lands presumably in equally high demand as grain fields or olive plantations. Alternatively, pig herds could be kept some distance from the city where fodder could be more cheaply produced, and either be herded or transported to Carthage as required, but, given the increased logistics of this, more probably on an annual cycle, perhaps timed to coincide with the harvesting of crops in the area, so that pigs could feed off the gleanings left behind, while making their way to market. Either option would tend to push sheep and goat pastoral operations even further back from the city, and would be most productive under a unified, extensive and relatively peaceful geographic and cultural domain as existed during Roman times. Although a number of piglet bones occur throughout all of the Carthaginian zooarchaeological assemblages, indicating at least some localized production of pigs in the suburban hinterland (or at least their quick and likely expensive transport from regions further away), most pigs from Carthage were killed around 2–3 years of age, presumably when they had attained maximum weights and could walk longer distances to urban markets or slaughterhouses under their own power. Pigs are not the easiest animals to maintain in the typically drier landscapes of North Africa, compared to relatively fertile, and more heavily forested places, such as Iberia or Italy. Consequently, they are not the best animals suited for typical North African environmental settings, unless market demands were sufficient enough (as in Roman times) to offset the extra costs associated with maintaining them under less favorable conditions, or in creating a more artificial environment (such as in feeding them more fodder, rather than allowing them natural pannage in forests, for example) to support and raise them.

Investigation of the faunal material from Carthage hints at changes in dietary and animal husbandry schemes through Punic, Roman, and Vandal/Byzantine times – specifically: (1) a steady decrease in cattle herding across this whole time period; (2) a significant rise in pig production during the Roman times, with some stability in their dietary contribution afterwards (at least until the Islamic period); (3) an importance of sheep and goat pastoralism throughout the ages, but with shifts in their husbandry operations and species ratios (sheep vs. goat), depending on the economic and dietary demands of the period in question. Corresponding corroborating evidence for such changes in the archaeological excavation record is problematic. There has been little excavation work done at sites in the Carthaginian hinterland, that is, beyond a one-two kilometer radius outside the ancient city walls. As this suburban hinterland is an area where farming villas would have been located during antiquity, it is integral to correlate their findings with the faunal data, particularly in terms of structures indicative of maintaining, herding, and exploiting animals. Overall, few ancient farming sites have been excavated throughout North Africa (with practically no known examples in and around Carthage), so there are little direct archaeological data to infer patterns of animal use and stock herding in rural areas in general for this important Roman province. Zooarchaeological samples (when recovered) from rural sites in North Africa are similarly of little help in this regard.

While direct excavation and zooarchaeological evidence for rural farming and husbandry operations in ancient North Africa is lacking, other indicators, especially archaeological survey work, show promise in deciphering patterns of land use in antiquity. Field survey data demonstrate that the North African countryside saw massive rural development in the Roman period, as agricultural demands on this province intensified (Mattingly 1988; Hitchner 1993). Survey work around Carthage, in particular, reveals a five-fold jump in the number of rural sites from the 4th century BC to the 3rd/2nd century BC, coincident with Roman annexation after the Second Punic War in 241 BC (Greene and Kehoe 1995). Regional settlement in the Carthaginian hinterland further increases under Roman rule, especially in the 2nd/3rd centuries AD, and remains fairly active under the mid-7th century. Ancient textual references further portray the Roman North African rural landscape as a rich investment area, populated with "*boni agricolae*" or "good farmers" (Stone 1998). When combined, these survey and textual results support those from the faunal data from Carthage itself indicating an active rural farming and herding zone outside of North African cities.

Garum *Manufacture and Fish Salteries*

North Africa is often listed as a key manufacturing region for *garum* (*i.e.*, fish sauce) during Roman times. Archaeologists and ancient historians have tracked the production and distribution of *garum* mainly on the basis of distinctive amphorae types that housed the product, examples of which have been recovered throughout the Roman world. Clearly *garum* was widely distributed, and presumably an important economic commodity in this regard (Curtis 1991). Although *garum* residues and deposits of tiny fish bones have been identified in a number of amphorae across the Roman world (*e.g.*, Van Neer and Lentacker 1994; Studer 1994), overall, limited zooarchaeological data exist to infer patterns for *garum* manufacture or fish salteries among archaeological sites, including Carthage. Considering their associated unpleasant odours, both industries are most commonly found outside ancient urban areas, but exceptions to this practice (*e.g.*, some sites in Spain, Portugal, and on the Black Sea) exist (Curtis 1991, 122–124). A Byzantine regulation allowed existing salt fisheries to remain within this zone, but restricts any new establishments to locate at least three stades from a town or village (Hurst 1994, 95; Curtis 1991, 188–189, note 18). Further practicalities, including a plentiful supply of fish (mackerel, in particular), convenient access to sources of fresh water and salt for processing the sauces, storage tanks to house, ferment and partially evaporate the mixtures, and heating facilities and kilns to aid in evaporation, as well as to fire the amphorae to contain the sauces would all be needed for any large-scale *garum* manufacturing venture (Trakadas 2004). Although numerous fish bones, from taxa associated with different ecological environments (*e.g.*, inshore rocky habitats, offshore surface to midwater habitats, and brackish to freshwater habitats), have been recovered from different sites in Carthage, no contexts produced significant quantities to establish them as, or even link them to, industrial salteries or *garum* installations. Even when preservation, recovery, and identification biases are standardized (fish remains are notoriously under-represented at most archaeological sites) the situation remains the same. Architectural indicators are equally inconclusive. Large tanks unearthed from the British Harbourside excavations could have been used for fish salting (Hurst 1994, 95), as hypothetically might any-sized tank found within the city. Still, the absence of evidence for large-scale processing installations across sites in Carthage does not necessarily imply an equal absence of fish processing operations at these sites, since *garum* could conceivably have been manufactured in pots or wooden tubs. Should these have occurred, however, such operations were likely small-scale, household or neighbourhood ventures, presumably insignificant in the scheme of urban *garum* production, and probably not important in any export marketing system. Moreover, since excavations have concentrated on sites within or just outside the city walls of Carthage, any *garum* manufacturing sites may simply have been overlooked in this fashion, if they were located outside of this range. Survey and excavation work at sites such as Nabeul and Leptiminus, both along the eastern coast of Tunisia, have revealed tanks for the production of *garum* (Mattingly *et al.* 2001), even if faunal data from these areas is inconclusive about such operations. Survey work to locate ancient industries along the coast at Carthage has been less successful in this regard, in large part due to modern development along the sea front, which has disturbed or obliterated traces of earlier activity here.

Bone Handicraft

The situation with bone-working in Roman Carthage may parallel that of *garum* manufacturing to a certain degree in the importance of small-scale operations. Worked-bone precursor materials, blanks, and partially carved end-products such as pins, handles, and hinges have been retrieved from many excavations throughout the city, but generally not in any significant numbers. The impression is that at one level bone-working was fairly universally conducted as local, and perhaps household, operations. Raw materials for this handicraft could have been purchased as a peripheral commodity at urban meat markets. The best bones to work are also ones typically associated with poor-quality meat in the lower legs, so such materials may have been readily available as a cheap by-product of carcass butchery and sold alongside cuts of meat. Raw material for bone-working may also have been available from local tanners, who may have received hides with the lower leg bones intact and removed them as a subsequent step during hide processing.

While household bone handicraft appears established throughout ancient Carthage (among all periods it would seem, given the wide temporal distribution of worked-bone precursor materials), there is also zooarchaeological evidence to suggest that bone-working also operated on a more professional and perhaps industrial scale, especially during Roman and late antique times. A significant quantity of horn cores, bone discards, and unfinished pieces (dating to the 5th–6th century AD) was discovered within a concentrated area outside the back wall of the Circus in Carthage (Hutchinson and Reese 1988). This collection attests to a fairly homogenous dumping of worked-bone waste products, as would only be expected from a larger-scale operation. Unfortunately, the locus of this, and other bone-working industries, within Carthage is elusive. On their own, they would be unlikely to leave any distinctive archaeological or architectural traces, outside of the bone materials themselves, which in this case appear to be have been cleared away to collective suburban dumps. Given the raw material connections this industry shares with butchery and other animal processing operations, including hide and wool-preparation, probable bone-working zones of the city may be demarcated if regions for these associated activities can be identified.

Wool, Hide, and Skin Processing

Tanning, fulling, and dyeing all typically involve foul-smelling compounds. Consequently, most of these activities (at least those conducted on a larger industrial scale) are located outside the urban core, similar to the situation for *garum* production. Like *garum* manufacturing, tanning, dyeing, and fulling also require tanks, in this case to contain dyes and chemical mixtures, so one can also draw upon this architectural evidence in conjunction with zooarchaeological data in reconstructions. Although scattered examples of tanks and cisterns are recognized throughout Carthage, those from the Ilôt and Harbourside excavations offer some of the best evidence for tanning, fulling, and dyeing within the city. Two large tanks were uncovered in Room 16S during the British Harbourside excavations, with further examples of cement-lined cisterns or tanks noted on the island (Hurst 1994, 94, 98). In addition, both sites yielded liquid-related features, including pits presumed to have held sunken vessels. While the tanks installation in Room 16s parallels Ostian and Pompeian dyeworks or fulleries (Hurst 1994, 94), corroborating zooarchaeological data from Carthage are also available to support such functions for the Ilôt and Harbourside areas.

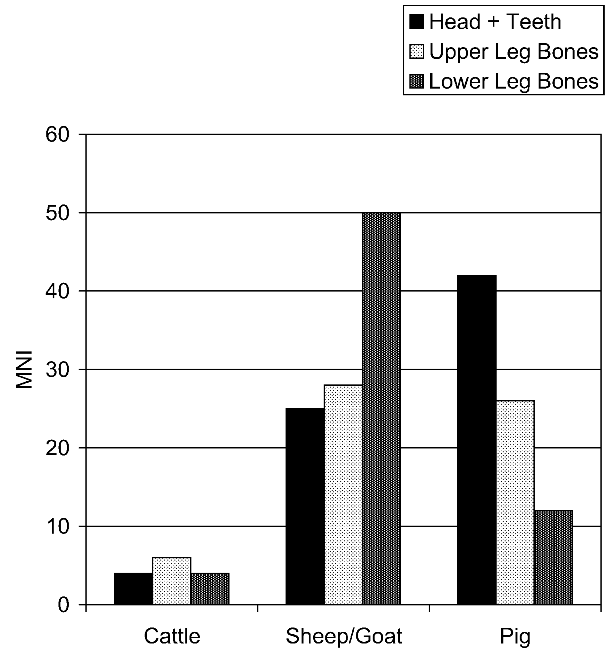

Fig. 15.2. Ilôt de l'Amirauté, Carthage: MNI counts for skeletal part categories for cattle, sheep/goat and pig, from Vandal/Byzantine deposits.

Figure 15.2 records the frequency of skeletal part categories by MNI count from Vandal/Byzantine levels at the Ilôt de l'Amirauté site for the principal domestic taxa (*i.e.*, cattle, sheep/goat, and pig). The Ilôt is the Island in the center of this Circular Harbour (see Fig. 15.1). Parts of all animals are recorded, so to some degree the Ilôt received generalized butchery and consumption waste from cattle, sheep/goats, and pigs. However, skeletal part frequency distributions vary depending on the taxon in question. Values among the skeletal part categories for cattle are fairly equal, indicating that whole individuals (or at least representative parts of the entire cattle skeleton) were disposed of in the rubbish dumps on the island. Values for pig are heavily skewed in favour of teeth, and lack lower leg bones; however, this distribution is typically manifested among faunal assemblages given the high durability of pig's teeth. Still, it can be argued that the Ilôt pig material primarily represents butchering waste (*i.e.*, the heads, stripped of meat, as waste), with cuts of meat from the legs exported and disposed of elsewhere. Most significant in this sample, though, is the high frequency

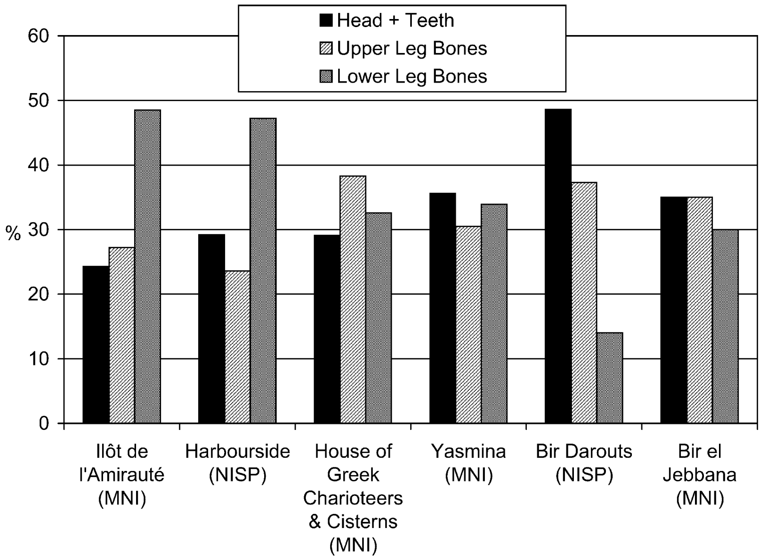

Fig. 15.3. Carthage: Skeletal part frequency for sheep/goats from various sites (Vandal/Byzantine levels exclusively).

of lower leg bones from sheep and goats, relative to other parts of their skeleton. Although the lower limb bones and phalanges of many animals, including sheep and goats, are somewhat durable and survive well in the archaeological record, so do teeth for that matter, and these elements are comparably under-represented. Rather, the data suggest that this skewed pattern in favour of sheep/goat lower limb bones has been shaped by cultural factors to some degree; it is not simply a factor of taphonomic or recovery biases. Moreover, as shown in Figure 15.3, this distribution is unique to the Ilôt and Harbourside samples compared to other Vandal/Byzantine sheep/goat assemblages from Carthage. With the exception of Bir Darouts (which records a dearth of lower leg bones – a recovery problem perhaps, since deposits here were not sieved), the remaining contexts show a more balanced distribution among the skeletal part categories – an indication of undifferentiated disposal of skeletal body part, as would result from discard of all parts of the animal in a shared dump. The best explanation for the lower leg predominance among the Ilôt and Harbourside contexts is that sheep and goat hides were brought to this area for processing and tanning with the lower leg bones still intact. Presumably the remaining parts of the carcass were kept by the butcher, or in the case of the head, which may be a waste product, disposed of at the slaughtering yard or butcher shop and not passed on to the consumer. Little available meat surrounds the lower leg bones of sheep and goats, and what is there is quite tough and of poor quality. Consequently, it was probably easier and economical to leave these bones in the hide rather than spend the extra time to remove them. Moreover, the added weight that the lower leg bones provided may have helped in stretching the hide if it was hung or draped during processing. The tanner would eventually remove these bones, and discard them with his waste products, hence the over-abundance in the Ilôt and Harbourside samples. Additionally, some of these bones could have been boiled to extract neatsfoot oil – a fine, thin oil which is excellent for treating and currying leathers (Serjeantson 1989, 141). Hurst (1994, 81, 83) envisions the Circular Harbour area of Vandal and Byzantine Carthage as akin to the *soukh* of later Islamic towns, and the faunal and archaeological evidence from the area lend support to commercial activities (such as tanning, dyeing, and fulling) being conducted here at this time. In part, the Ilôt may have been an ideal spot – somewhat removed from residential areas, positioned to take advantage of NE sea breezes to temper unpleasant smells, surrounded by an abundant source of water for washing hides and disposing of liquids, and centrally located to serve a large market in need of fabrics, cloths, and leathers. No doubt other tanning industries existed outside the city as well (and necessarily so during Punic and Roman times when the Ilôt served different economic and religious functions as a shipshed or temple and stoa complex) but the Vandal and Byzantine example presented here highlights the importance of zooarchaeological evidence in reconstructing urban economic activities.

Conclusions

To summarize, zooarchaeological data from Carthage indicate that Roman urban expansion and elite tastes for pork, lamb, and related market-driven foodstuffs placed extra pressure on suburban farmers to supply the city year-round with the necessary meats, in turn pushing traditional shepherds further afield, and significantly reducing the importance of herd cattle. As Roman influence waned in Late Antiquity, suburban pork and choice-meat farms became too expensive to maintain and the hinterland zone reverted back to agricultural and pastoral land, slowly progressing from a high predominance of sheep to a greater role for goats, which could adapt better to the deteriorating environmental conditions. *Garum*, bone-handicraft, and wool/hide processing operations were also shaped by

Roman influence in the area, with many of these activities increasing in scale, although with less zooarchaeological data to confirm such a transition.

Overall, perhaps more trends and patterns of "romanization" have been identified and described than have been explained in this current assessment of zooarchaeological indicators of cultural change in Carthage. The latter, the "whys" of "romanization," admittedly are difficult to address without examining all the inter-related physical, cultural, social, economic, political, and ideological factors (among other variables) that shape aspects of colonization, a topic beyond the scope of this analysis. Cultures operate as a system, with a complex network of positive and negative feedback mechanisms influencing and determining patterns of behaviour. Still, a common element in the Carthage zooarchaeological examples here is that of elite influence in bringing about change. Urbanized centers, such as Carthage, with a greater affinity to Rome (be this through a longer tradition or because of the concerted and exploitive efforts of local elites) are more likely to adopt the more typical "romanized" trend of increased pork consumption, and in turn shape husbandry operations in the immediate hinterland to suit these needs. This "elite-driven" model has been used to explain "romanization" in general. At the same time, however, we cannot ignore the role of natives in the process of "romanization," and the various attitudes of resistance, acceptance, assimilation, and creolization or cultural blending they can manifest. Transhumant operations involving sheep and goats have traditionally played an important role in North African animal husbandry schemes, and aspects of this tradition remained throughout Roman times. Although the practice of year-round pasturing of sheep and goats in the vicinity around Carthage developed, or at least increased in scale with Roman contact and expansion into these regions, traditional transhumant schemes of moving stock to peripheral areas, such as desert fringes or upland slopes, during periods of the year when lands closer to Carthage were in crop were never supplanted fully. Rather, Roman contact created a new interplay of augmented year-round pasturage of large flocks in suburban hinterlands with maintenance of traditional transhumant herding.

Currently, there seems to be a resurgence of interest in cultural identities of the past, and "romanization" stands as a dominant aspect of study. No doubt, zooarchaeologists will have an increasingly busy role to fulfill in this debate, as the discipline aids in illuminating aspects of cultural contact.

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16. Animal Keeping and Roman Colonization in the Province of Pannonia Inferior, Western Hungary

Kyra Lyublyanovics

The Roman occupation brought revolutionary changes to the lives of the late Celtic populations living in the area west of the Danube. A number of archaeological sites dated to the 1st–4th century AD containing the remains of Celts and Celto-Roman population has been excavated in Hungary, especially in the area of Aquincum (now part of the Hungarian Capital, Budapest), the capital of Pannonia Inferior. The animal bones that have come to light offer an opportunity to examine changes in animal keeping and meat consumption customs during the colonization process. The sites that provide basis for this research include a large amount of Celtic material dating from just before the Romans began to settle in the region, as well as romanized Celtic assemblages. The proportion of species, the role of wild animals in the diet, the animals' age at death, and the methods of butchering differed between the Celtic and romanized populations. However, the poorer, less acculturated Romano-Celtic populations retained many features of the food preparation traditions of their pre-Roman ancestors. The main goal of this study is to pinpoint the characteristic effects of Roman traditions on local Celtic animal husbandry and food preparation.

Keywords: Pannonia, Romanized Celts, Eravisci, Hungary

Introduction

The great changes in animal keeping practices in the Iron Age in Central-Eastern Europe appear first with the Scythians, and then with the Celts. More modern animal keeping developed in this period, and this process was accelerated by the Roman Conquest. Roman animal keeping was much more deliberate than that of the local inhabitants and resulted in breeds with greater output and a more prolific livestock of a better quality.

The former Roman province of Pannonia Inferior was inhabited by a nonhomogenous Celtic population from the 4th century BC. Roman military troops appeared in the region in the 1st century AD, and Romans established the province of Pannonia on the territory lying west of the River Danube. The romanization of Eraviscus Celts here seems to be a slow process scarcely mentioned by antique authors, so archaeological finds are especially pertinent to this problem. Most of the information we now have about Celts and their romanization is based on evidence from Western Europe, that is, the native people of the provinces Gallia and Britannia. It would be incorrect to use the same arguments for the East Central European area, where the political, historical, and geographical conditions were quite different.

Where there were large oppida and fortified settlements, the Roman rulers either totally eliminated them so that they could not form centers of resistance, or fitted them into the *limes* system; these were occupied by auxiliary troops. The smaller, open agricultural settlements–villages–probably survived well into the Roman Imperial period; however, there is not much evidence for their continuity (Gabler 1982, 57–58). As a matter of fact, Romans were not specifically present as an ethnic group in Pannonia, but they were present as a political entity. There was a continuous influx of foreign soldiers and their families and followers from Italia, Gaul, Britannia, Africa, and the East into Pannonia. Barbarians (Dacians, Quadi, Vandals, Sarmatians) also found their way into the region. It is convenient to speak of 'Romans' in the sense of political and social organization, but the ethnic composition of the provincial regions must have been complex. These groups must have had an impact on agricultural traditions, tastes, and preferences in food, cults, and rituals. The picture is even more confused by the conquerors' need to maintain the symbols and tastes of Imperial Rome as a superior culture (Mócsy 1990, 237–242; Choyke 2003, 210).

The newly established administration was run by Roman officers. They tried not to influence the day-to-day life of the indigenous tribes more than was necessary for maintaining political dominance (the new political formations created by Romans usually were based on already existing power-structures) (Szabó 2005, 177). We have a lot of information about Roman animal keeping, but we do not know much about the changes that took place in the lives of the Celts when Romans appeared in the Carpathian Basin. The fauna of the Celtic period is not well-known because only a few large settlements have been excavated. However, the samples from small settlements and cemeteries show that the animal husbandry in the early part of the Roman period in this region developed out of the animal keeping of autochthonous inhabitants, though under the influence of absolutely different factors such as Roman animal import. On big estates organised by Romans, a more conscious animal breeding was practiced, which resulted in individuals larger in size and greater in output, especially in case of cattle and sheep; the remains of these animals strongly differ in their osteological characteristics and horn forms from the primitive type of animals of the local peoples. However, as Roman influence was not uniform in all geographic areas, the emerging picture of the fauna is not uniform either (Bökönyi 1988 34–35, 128).

Our information about Celts and Romans living side-by-side is scanty. Some of the sites included in this paper are older excavations, where excavation techniques were rather poor, and not all the data have been published. One of my goals is to integrate these older data which have not yet been assessed properly into a study of a wider scope. Even though in some cases only the very basic data have been recorded and thus the complex and detailed analysis of the site is impossible, the species ratio and butchering marks may provide valuable information on connections between colonization and changes in household activities, a key area of ethnic traditions.

Material and methods

Unfortunately, the Celtic villages excavated so far have relatively few bone finds, and not all of them are identified and published (most sites were analyzed by Sándor Bökönyi and István Vörös). Faunal remains represent consumption, not production, and saying anything about animal keeping by romanized Celts and the role of animals in the economy of the small villages of local inhabitants can be very problematic if the only source of information is faunal remains (Choyke 2003, 217). The sites are usually mixed, with the Celtic, Romano-Celtic, and Roman materials difficult to separate; the exact dating of refuse pits is often challenging. The sites mentioned in this study are located mostly in the area of the former Roman city of Aquincum, in the territory of the Hungarian capital city Budapest, and at the Lake Balaton. After the Roman conquest, Aquincum can be thought of as having existed in three parts: a legionary fortress with the Military Town, the Civil Town, and the surrounding *territorium* (Choyke 2003, 217). Our Aquincum sites are located in this latter area. Assemblages of Celtic origin at the Lake Balaton are located in the habitation area of the same Eraviscus tribe that we find around Aquincum. All sites are dated between the 1st and 4th century AD; these are small settlements with pits containing kitchen rubbish. Some of the sites, *e.g.* Corvin Square, included separable Celtic, Roman, and Celto-Roman layers as well. In such cases, I only examined the Celtic and Celto-Roman finds, not the pure Roman layers.

These sites reflect the situation at the time when the Roman troops moved into the area. The conditions in different geographical regions were not the same; the Szakály-Réti Földek site in southwestern Hungary, for instance, was isolated, and thus the undisturbed life of the Celtic population continued well into the 4th century AD. On the other hand, sites located in the area of Budapest–Gellért Square, Gellérthegy-Tabán, Corvin Square, and Bécsi Road–were located in one of the most important areas of Roman rule. The sites analyzed are listed in Table 16.1; their geographical location is depicted in Figure 16.1. In my study, I concentrate on the differences between pure Celtic and romanized Celtic faunal assemblages.

The largest Celto-Roman assemblage, from Bécsi Road, contained only 518 identified bones, while in Balatonszemes there are 129 bones, and only 32 pieces were recovered from the pit dwelling from Corvin Square. These data, although they are too few to give a precise picture of romanized Celtic customs, raise interesting questions.

Measurements used in this study are based on the methods of Von den Driesch (1976). Withers height calculations are based on the methods of Kiesewalter (1988), Matolcsi (1970), Teichert (1969, 1975), Godynicki (1965) and Harcourt (1974).

Occurrence and distribution of species in the kitchen rubbish

According to Sándor Bökönyi, the peripheral areas of the Roman Empire in Central and Eastern Europe show a notable variability in the importance of domestic and wild species and this depended largely on the character of the settlement. While in towns and villas the proportion of wild animals was smaller since they are less important as meat sources, the opposite tendency can be observed in military forts (Bökönyi 1974, 14). Meat consumption in Roman Pannonia may also have been dependent on political stability, which defined the site's access to central markets *versus* locally exploited and hunted livestock (Bartosiewicz 1990–91, 104). Since the population of Roman Pannonia was mixed and ethnically varied, species ratios would also have been influenced by various traditions in food consumption and cooking. However, in settlements where the presence of populations of Celtic origin has been noted, some similarity with purely Celtic sites is to be observed.

At the analysed Celtic and Celto-Roman sites we find the well-known domestic animals: cattle, pig, sheep, goat, horse, and dog, in addition to red deer and a small number of other wild species. In Szakály-Réti Földek, the remains of domestic ass also came to light. The distribution of species is shown in Figure 16.2.

Site name	Site description	Dating	NISP
Balatonlelle – Kenderföldek	Celtic settlement and Roman settlement in superposition	1st–3rd c. AD	*Celtic* n = 517
Balatonkeresztúr – Réti dűlő	Celtic settlement	1st BC–1st–3rd c. AD	n = 1369
Corvin Square	Celtic settlement, Roman cemetery, Celto-Roman refuse pits and pithouses in superposition	1st–2nd c. AD	*Celtic* n = 1178 *Celto-Roman* n = 16
Zamárdi – Kútvölgyi dűlő	Celtic settlement	1st–3rd c. AD	n = 279
Iván (Bökönyi 1988)	Celtic settlement	1st–4th c.	n=49
Szakály-Réti Földek (Vörös 1982)	La Téne / Celtic settlement	1st BC–4th c. AD	n=1442
Garadna (Bökönyi 1988)	La Tène settlement	1st–4th c.	n=228
Sopron-Krautacker* (Jerem - Facsar - Kordos - Krolopp - Vörös 1984, 1985)	Hallstatt, early La Tène / Celtic settlement	2nd–1st c. BC	*Celtic* n=144
Gellérthegy-Tabán** (Bökönyi 1969, Matolcsi 1979)	Celtic settlement	1st c. AD	Excavation 1, *Celtic* n=295 Excavation 2, *early Imperial Period Celtic*, n=179
Bécsi Road 38-44	Celto-Roman settlement	1st–3rd c. AD	n = 518
Balatonszemes	Celto-Roman	1st–3rd c. AD	n = 129

** The site Sopron-Krautacker included numerous layers, but I only took the Celtic material from the Late La Tène period into consideration.*

***Two excavations were carried out at Gellérthegy-Tabán, and the animal bones were identified by two different experts, S. Bökönyi and J. Matolcsi.*

Table 16.1. Sites analyzed in the study.

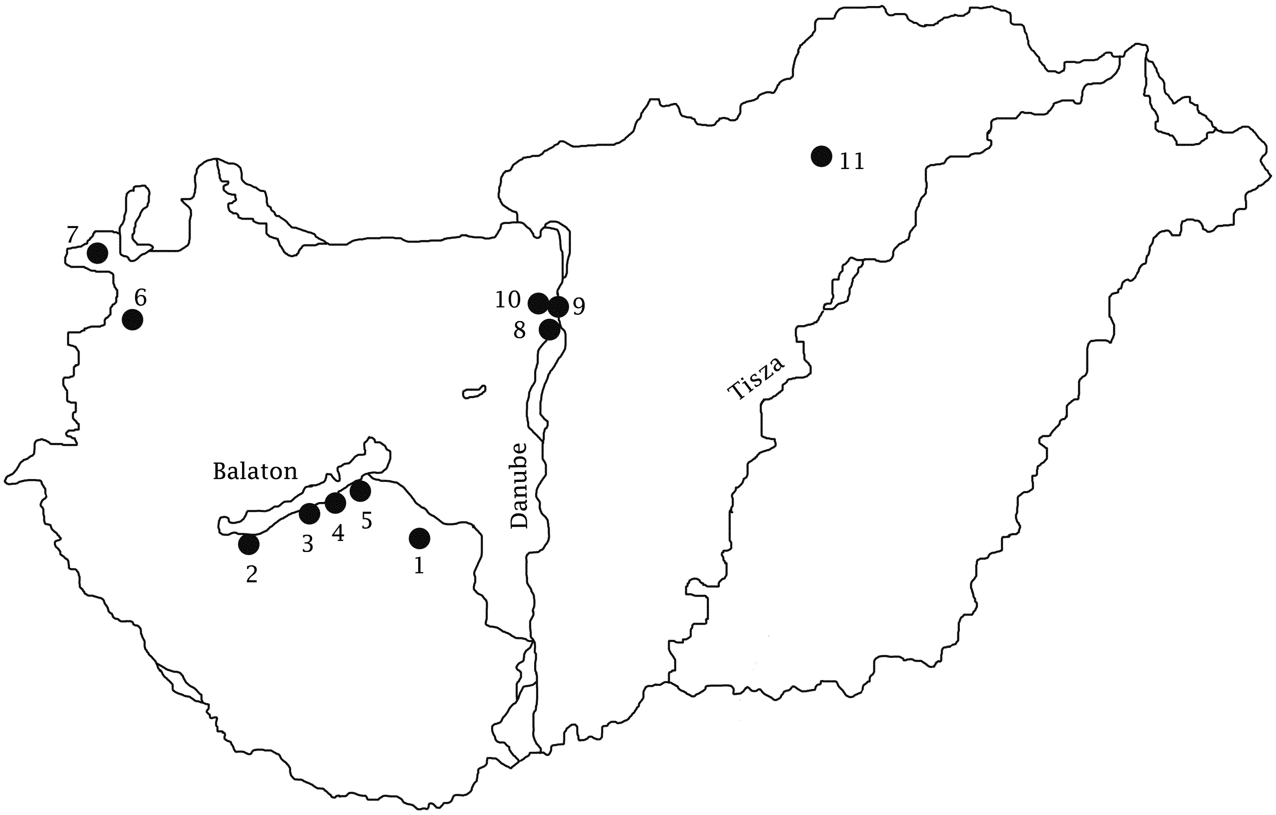

Figure 16.1. The location of the sites in present day Hungary. 1. Szakály-Réti Földek, 2. Balatonkeresztúr-Réti dűlő, 3. Balatonlelle, 4. Balatonszemes, 5. Zamárdi-Kútvölgyi dűlő, 6. Iván, 7. Sopron-Krakatauer, 8. Corvin Square, 9. Gellérthegy-Tabán, 10. Bécsi Road, 11. Garadna.

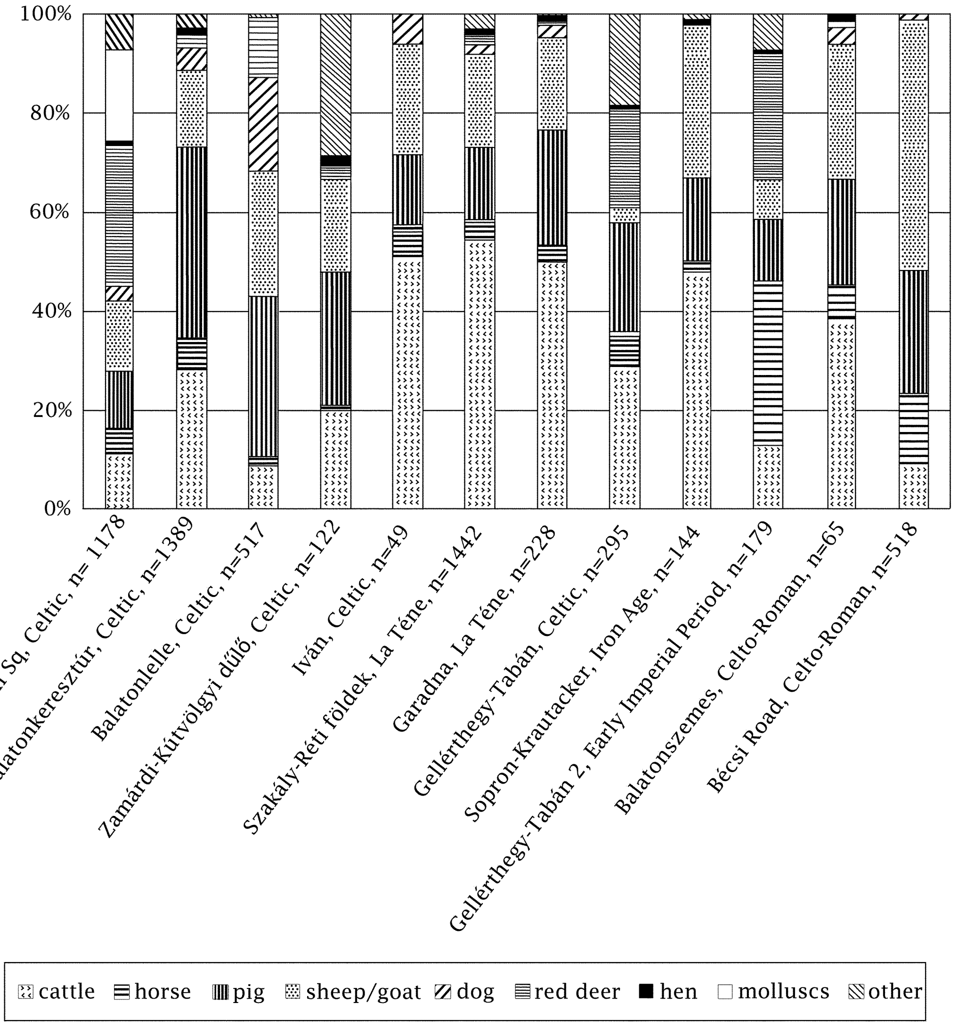

Figure 16.2. Distribution of species. The category 'other' includes wild species such as roe deer, wild boar, aurochs, and animals hunted for fur, as well as rodents, fish, and amphibians. Sieving was not carried out on every site, but where it was, there a large spectrum of species came to light. At Zamárdi-Kútvölgyi dűlő, this produced many badger bones. I have excluded the animal bones of the Celto-Roman pithouse at Corvin Square because of the extremely low number of finds (16 pieces).

In the main, cattle bones dominate the faunal assemblages from Celtic sites, followed by pig and the small ruminants. This is most obvious at Szakály, Sopron, Iván, and Garadna, where cattle represent ca. 50% of the kitchen refuse.

Pig bones dominate at the sites of Balatonlelle, Balatonkeresztúr, and Zamárdi, villages located next to Lake Balaton. In the material from Balatonkeresztúr-Réti dűlő, pig makes up 38.4% of the sample, cattle 28.7%, and caprinae only 15.6%. In the Celtic levels at the site of Balatonlelle, pig bones represent 38.5% of the identifiable pieces. Romans often referred to Pannonia as *glandifera*, which means "rich in mast." Geographical characteristics of the Carpathian Basin were ideal for pig keeping, and this species, which also had a religious significance for the Celtic population, usually accounts for a substantial part of the kitchen refuse produced by Celts. Pigs usually represent ca. 30% of these assemblages. Pigs could be exploited economically due to their prolific nature, while the surrounding acorn oak forests ensured that there was enough fodder for them.

Small ruminants (sheep and goat) represent 15–20% of the Celtic assemblages. In Sopron, the proportion of small ruminants is over 30%, but in most cases they do not exceed the pigs in number.

The relatively large ratio (22.4%) of dog remains at Balatonlelle may indicate that their meat was consumed, a phenomenon not unknown among the Celts (Szabó 2005, 88). However, there is no unambigious proof of dogs being used as meat animals at this site. On the other hand, at Balatonkeresztúr several cutmarks were found on dog bones, such as the pelvis and vertebrae, which indicate that their meat was consumed. Where cutmarks occur on the lower extremities, the use of dog skin may also be a possible explanation.

It is likely that different kinds of animal husbandry existed among various Celtic groups living in the Carpathian Basin. Where the environment was ideal for pig keeping, pigs were kept as a primary meat source, while cattle dominated at sites where pig keeping would not have been so economical, due, for example, to a lack of mast. In addition, there are

	Balaton-keresztúr	Balaton-lelle	Corvin Square	Sopron	Balaton-szemes	Garadna	Szakály	Gellérthegy-Tabán	Zamárdi
Cervus elaphus	X	X	X	X	X	X	X	X	X
Capreolus capreolus	X		X			X	X	X	
Sus scrofa	X	X	X				X	X	X
Bos primigenius	X							X	
Lepus europaeus			X					X	
Ursus arctos	X		X						
Castor fiber	X		X					X	
Vulpes vulpes			X						
Meles meles			X					X	X
Cricetus cricetus				X				X	
Citellus citellus		X		X				X	
Spalax hungaricus								X	
Buteo buteo								X	
Emys orbicularis	X	X		X					X

Table 16.2. Presence of wild species at the Celtic sites.

settlements with bone assemblages that reflect an animal keeping not much different from that of the Bronze Age. At such settlements hunting also might have comprised a significant part of the meat supply.

Animal bones found in the Romano-Celtic layers of Balatonszemes reflect the importance of cattle (38.51%), followed by sheep and goat (27.7%); red deer and hen are also present. However, in the material from Bécsi Road, cattle make up only less than 10% of the faunal sample; pigs represent 25.3%, while sheep and goats represent more than 50% of the refuse. Wild species and domestic fowl are totally missing from this sample. This distribution differs from Celtic assemblages where the dominance of cattle, pig, and/or wild species is usual. At the other romanized Celtic site, Balatonszemes, the proportion of pig bones is 21.5 %, cattle reaches 38.5%, caprinae 27.7%, and red deer comprises only 1.53 % of the total. Large herds of sheep were apparently kept on nearby Roman villa farms, and there is evidence that they were consciously bred for meat and production of better quality wool; one of the centers for wool production was Siscia (present-day Croatia), where wool was brought in and processed (Mócsy 1956, 5–87). At the Celto-Roman sites of Balatonszemes and Bécsi Road, the considerably decreased ratio of young individuals among sheep and goat remains may also speak for a growing emphasis on wool exploitation. There is some reason to consider the growing significance of sheep and goat as a possible sign of Roman influence (Bökönyi 1988, 177).

Horses are somewhat overrepresented in the early Imperial Period layers of Gellérthegy-Tabán; according to J. Matolcsi, the bones come from only one or two individuals. (Matolcsi 1979, 287–291) Nevertheless, horse usually represents ca. 6% in faunal materials from Celtic assemblages, something also reflected in the Celto-Roman material from Balatonszemes. At the Bécsi Road site, horses represent 14.07% of the sample. However, these are quite small assemblages, so we must not forget that these data should be used heuristically but not analytically. In the latter material, three partially articulated horse skeletons were found in two pits; these are obviously intentional deposits and not kitchen refuse. The individuals cannot always be separated in the other pits, and it is difficult to say how many individuals there actually were. One of them certainly was a small sized stallion. Horses were usually not used in agricultural work by the Celts; instead they were used as riding or pack animals, and they were eaten only in times of food stress (Vörös 1982, 142–143).

Evidence of Roman influence may be found in the presence of domestic ass at Szakály-Réti Földek. Its presence probably results from commercial relations with Italia and South Illyria. At another La Tène settlement, Pilismarót-Basaharc, domestic ass was discovered as well. As Vörös claims, if the *asinus*-sized dental and postcranial bones found at Manching really came from asses, its presence may be an evidence of mercantile activity (Vörös 1982, 137–138). Nevertheless, these finds are rare, and in the Romano-Celtic assemblages examined in this paper there is no domestic ass.

At Celtic sites, the dominance of domestic animals as food resources is usually clear. On large Celtic sites in Europe such as Tiefenau-Spital or the oppidum of Manching, wild animals represent an insignificant part of the faunal sample, sometimes less than one percent of the material. However, there are several sites which reflect a greater importance of hunting, such as Gellérthegy-Tabán, Corvin Square, or Larina-Chatelans in France. (László Bartosiewicz and Erika Gál discuss the role of game in the Celtic faunal assemblage from Sajópetri; Bartosiewicz and Gál, this volume). These sites have been interpreted as inhabited by populations that were involved in other kinds of economic activities and who acquired their meat protein from trade or hunting rather than farming (Bökönyi 1968, 238–240; Szabó 2005, 88). At Corvin Square, the importance of red deer is notable (28.63%). At Gellérthegy-Tabán, not only did the indigenous Celtic people secure their meat needs by hunting large game, but they seem to have maintained this activity in the Roman Imperial period as well, when imported and local domestic animals were already available on a large scale. In addition to large game slaughtered for meat, we occasionally find remains of animals killed for their fur, such as badger,

	Bos taurus	*Sus scrofa f. domestica*	*Ovis aries/Capra hircus*
Balatonkeresztúr	11.6%	68.5%	17.9%
Balatonlelle	12.9%	87.9%	-
Corvin Square	9.34%	16.2%	14.7%
Zamárdi	-	30.3%	17.3%
Bécsi Road	17.7%	29.0%	8.71%
Balatonszemes	4.0%	14.2%	11.1%

Table 16.3. Proportions of young individuals at Celtic sites.

otter, and red fox. At the site of Zamárdi-Kútvölgyi dűlő, many badger bones came to light, probably because their fur was exploited. The occurrence of wild species is listed in Table 16.2.

A quite large spectrum of wild animals was discovered at the Celtic sites, especially in the Celtic layers of Corvin Square and Gellérthegy-Tabán. However, almost the same spectrum may be found at some Roman military forts and settlements, but typically, hardly any wild animals are found on Roman sites. Rodents and tortoises that have been found may be secondary deposits, but it is possible that these species were eaten as well.

At romanized Celtic sites, wild species actually vanish from the assemblages, or at least, decrease in importance. However, in the early Imperial Period of the Gellérthegy-Tabán site, the proportion of red deer still reaches 25.7%. It can be suggested that the elite had the right to hunt as did military officers – hence the higher percentage of red deer and other game animals at auxiliary forts. Actually, we do not have any evidence of Roman influence here; the proportion of wild species is also high in the early layers, and it is likely that inhabitants of this settlement maintained their traditions of animal husbandry independent of the Roman occupation. Red deer only occur in the Celto-Roman layers of Corvin Square, and one bone from roe deer was excavated at Bécsi Road, although no wild boar or aurochs was found on these Celto-Roman sites. The relatively rich avifauna of Roman and Celtic sites is missing from Celto-Roman assemblages as well. A possible explanation is the low number of finds, making the presence of such rare species as crane or white-tailed eagle less probable. However, it is likely that the population of romanized Celtic settlements where large game is missing had not relied on venison and wild boar meat for food before the Roman Conquest either. A hunting prohibition was possibly implemented by Roman law, but there is no evidence that such a prohibition would have been followed.

Mortality profiles for samples from these sites unfortunately were not always published; from the known data, however, a non-homogenous picture emerges. The proportions of young individuals are listed in Table 16.3.

Not surprisingly, young individuals are most frequently found among pigs. The proportion of infantile and juvenile pigs is extremely high at Balatonkeresztúr and Balatonlelle, which shows that this species must have been present in abundance. At Bécsi Road, 29.0% of the pig remains come from infantile or juvenile individuals; this proportion is 8.7% in case of sheep and goat. At Balatonszemes, just as in the Celtic material from Corvin Square, the proportion of young small ruminants approaches the proportion of young pigs. The relatively few bones of young sheep and goats at Bécsi Road may indicate the secondary use of caprinae in wool production.

Fishing may have played an important role in food traditions but, unfortunately, screening and sieving has rarely been carried out on these sites, so fishing is underrepresented, and the absence of smaller fish remains results in a distorted picture where fish bone is present in the faunal sample. Hopefully, more meticulous excavations in the future will provide sufficient data for research.

Animals with religious significance

Was hunting primarily for food by certain groups of the Eravisci and their romanized descendants, or did it also have religious aspects? Cultic red deer graves have been discovered several times at European Celtic settlements where whole bodies or parts of the animal have been buried. No such cultural phenomena were discovered in the assemblages discussed here; this, of course, does not prove that this kind of cult did not continue into the Roman period. At Corvin Square, 28.6% of the Celtic kitchen refuse comprised red deer bone, so that hunting this species served real nutritional purposes. The same is true for the Gellérthegy-Tabán Celtic settlement, where red deer represent 20.3% of the assemblage. However, this is not characteristic of all Celtic settlements; in all probability, hunting was important only in areas where agriculture played a less substantial role in the local economy (Bökönyi 1969, 239).

Red deer antler has come to light in the Celtic cemeteries of Sopron-Krautacker, Mátraszőlős, and Novajidrány, and from many excavated Celtic settlements, *e.g.*, Sajópetri and Tihany-Óvár. Whole skeletons of red deer were discovered at the settlements of Keszthely-Fenékpuszta and Szakály. Some of these finds have been interpreted as sacrifices connected to the god *Cernunnos*, who himself had antlers (Szabó 2005, 98; Olmsted 1994, 335–336). Deer was frequently linked to water and springs; it had a role as companion to the dead on the way to the underworld, and antlers could be worn as symbols or talismans (Petres 1972, 380–381).

At Szakály-Réti Földek, a sacrificial red deer skeleton was found in one of the pits. On the bottom of the pit was ash, charcoal, and carbonized grain, and some La Tène D pottery. The pit included the whole body of a 3–4 months old calf. To date, very few similar sacrificial pits have been excavated. In Slovakia, at the 2nd–4th c. AD

Ondrochov-Lipová site, the skeletons of a roe deer buck and a child were found together in a pit (Vörös 1986, 38), and we know about ritually buried antlers from Pákozd (Petres 1972, 381–382) and Pilismarót as well, where they were buried together with human heads. As an interesting addition to the picture in Hungary, where red deer burials and ritually buried antlers came to light from the La Tène period, red deer usually also appear on the zoomorphic decorations on the painted pottery of the Eravisci (Póczy 1952, 99–107). During the process of romanization, deer became the companion of *Dis Pater Silvanus*, and traditions connected to red deer did not necessarily disappear. A possible proof is the literary heritage of the Celtic tribes in Great Britain, where red deer often appeared in sacral contexts (Vörös 1982, 39).

Wild boar is one of the most important totem animals of the Celts from Gaul. Many bronze statues of boars have been discovered (some of them came to light in Pannonia, *e.g.*, the famous bronze statuette from Báta), and there are numerous references found in Celtic mythology that bear witness to the importance of this species. Tacitus mentioned that the Aestius Celts wore boar-amulets, because wild boar was respected as a holy animal of the maternal goddess, and these amulets were supposed to protect warriors in battle (*Germania* 45). Approximately 80% of the Celtic graves discovered in Hungary contained wild boar or pig remains, which is explained by the religious cult of *Cernunnos*, ruler of the underworld, who, beside deer, had boars following him as servants (Szabó 2005, 98). A headless skeleton of a pig was brought to light in one the Celtic houses at the site of Sé (Szabó 2005, 102). Archaeozoological settlement assemblages offer no sign of the special significance of wild boar or red deer at either Celtic or Celto-Roman sites in the region. However, religion and everyday life do not represent equivalent social contexts and most of the material reviewed here comes specifically from kitchen refuse. Religious traditions could well have been continuous even if animals as religious symbols are not reflected in the refuse sample from food and craft production.

As a case without parallel, the complete skeleton of an adult female red fox was excavated in the cemetery of Tiszavasvári-Városföldje-Jegyzőtag. The animal was placed next to an urn, together with food offerings (Vörös 1998, 110). Similarly, the bones of a badger were found in one of the graves of the Arnót-Homokbánya Celtic cemetery (Vörös 1994, 85–100). There is no reasonable explanation for these phenomena based on currently available data.

Wild animals formed a small but common part of the Roman diet in Pannonia. However, the Roman troops that arrived in Pannonia were not ethnically homogenous, which means that there might have been individuals or groups of individuals practicing other, non-Roman religious cults among them. It is unclear to what extent their attitude influenced the Celtic traditions.

Not only wild species, but domestic animals, especially pigs and hens, played a role in local Celtic religion. This is clearly shown by the animal bones found in cemeteries. Based on what is known today, bones of pigs and hens absolutely predominate in cemetery materials, throwing light not only on the rituals, but on the fact that these species must have been common in the domestic livestock (Bökönyi 1988, 35). In the Celtic cemetery of Tiszavasvári-Városföldje-Jegyzőtag, 12 graves included animal bones as food offerings; pig bones in 9 graves, hen and sheep in 2 graves. In addition, 2 possible amulets were found in a woman's grave: the lower left canines of a dog and of a boar respectively. Both were perforated, with traces of metal in the hole (Vörös 1998, 107–111). In the cemetery of Pákozd, bones of dog, cattle, ass (!), and cat also came to light within a sacrificial context (they were buried together with human heads and date to the first part of the 1st century AD) (Vörös 1986, 31–40, Petres 1972, 370–380). These phenomena, however, are not fully understood.

An interesting ritual context related to Romano-Celtic bone finds was observed during the excavations at Kolossy Square, south of the Military Town of Aquincum. Three skeletons of large dogs were found under a threshold at a stone building. The building included human burials within the walls, which is a distinctly non-Roman custom. This and some other finds led the excavator Erzsébet Márity to suggest that this building had been occupied by romanized Celts who still followed some of their old ways (Choyke 2003, 229).

Quality of the livestock

Unfortunately, the Celto-Roman assemblages examined here are extremely fragmented. Practically no well-preserved bones were found, so the estimation of withers height was rarely feasible. Bones displaying pathological modifications are of little help in estimating the quality of the livestock. The number of such finds is low, and all are related to traumatic injuries, mostly break and arthritis, rather than epidemic diseases. On the other hand, animals that were slaughtered for meat were generally killed before diseases were manifest on their bones.

Cattle

Neither the Roman nor the Celtic livestock was homogenous; Romans bought cattle from barbarian tribes such as the Sarmatians, even though they often used more consciously bred animals, imported from other Roman provinces. In general, Iron Age cattle of the region were small animals; only medieval cattle are smaller. Our Celtic material consists of small, short-horned *brachyceros* cattle, a population that probably belonged to the local inhabitants. Similar types of cattle were found in Austria, Switzerland, Germany and Hungary. The few large individuals found in these assemblages may have been Roman peninsular imports, but up to the time of Roman rule and the start of the lively trading contacts between Romans and Celts they had little influence on local livestock. Actually, it is not clear whether this large breed of cattle was a result of better husbandry techniques and conditions of improved Roman breeding. The larger individuals are usually found on the great estates (Roman villas) of rural Pannonia, where their superior strength would have been important in ploughing large fields (Choyke 2003, 213).

In the bone assemblage from Balatonkeresztúr, cattle with wither heights of 101 cm to 128 cm appear, with an average of 108 cm. The average withers height of cattle in the oppidum of Manching was 113 cm, but oxen of 135 cm size (probably Roman imports) appeared as well (Bökönyi 1988, 123). In Balatonlelle, a cow was found with a withers height of 122.8 cm. From the Celtic layers of Corvin Square, the remains of a cow of 111 cm withers height, and another with a withers height of 115 cm were recovered. These animals in all probability represent the primitive livestock of the local population. Cattle of medium to extremely large size were present at the Szakály-Réti Földek site (121.7–142.8 cm withers height). Vörös concluded that these larger individuals originated from the Roman livestock. Roman animal breeding produced larger animals and had greater productivity compared to local indigenous cattle. New cattle populations reached the area through animal trade, so that improved animals could even have reached "pure Celtic" settlements prior to the Roman occupation (Vörös 1982, 133–135, Bökönyi 1988, 128–129). However, cattle in the Romano-Celtic assemblages examined here were small and of the *brachyceros* type. No bone fragments from larger animals of Roman origin were found. A single individual found at Balatonkeresztúr might represent an imported animal although, since the individual was identified as a bull, a withers height of 128 cm cannot be considered gigantic, only tall.

Sheep

The Roman sheep stock also differed from that of the Celts. This difference may have been evident in the quality of wool and increases in size (Bökönyi 1988, 128). In Roman period Pannonia, sheep were much more common than goats. It has been suggested that sheep might have been primarily exploited for their wool (Fitz 1980, 325); however, it is not certain since the kill-off patterns have not been properly recorded. Iron Age sheep were similar to the size of Neolithic-Copper Age animals; in Manching, 63–66 cm was the average withers height (Bökönyi 1988, 177). Such small individuals were also present in the Celtic assemblages analyzed here. At Balatonlelle, there was an individual with a withers height of 66.3 cm and at Balatonkeresztúr, there was a sheep with a 56.9 cm withers height. At Szakály-Réti Földek, there were sheep with withers heights of 62.6 cm and of 53.8 cm. The Romano-Celtic material displays no differences from the Celtic assemblage: the fragments represent a relatively small, primitive type of sheep. At Bécsi Road, individuals with withers heights of 46.8–60.6 cm were discovered, with an average of 52.8 cm. Thus, these animals were even smaller than those from the Celtic *oppidium* at Manching. No individuals with reduced horn cores were found.

Pig

The large numbers of juvenile pigs recovered from these assemblages also meant that few bones were measurable. The Iron Age pig population was not homogenous and displayed local differences, although it was mainly dominated by small, primitive individuals. One respectably-sized individual from the Celtic layers at Balatonlelle had a withers height of 79.5 cm. This animal could have been cross-bred with wild swine. The statuettes of swine found at Celtic sites are relatively uniform in appearance and have been interpreted as representing primitive domestic pigs with traces of crossbreeding with wild boar. They have long heads, big tusks, erect crests of hair along their backs, arched backs, and long legs. However, their tail is depicted as curling upwards, which is a characteristic present only in the domestic form (Bökönyi 1988, 215). Whether the mixture of traits represents actual practice or artistic convention is not known. The Romano-Celtic material included no measurable pig bones, but the existing fragments seem to come from primitive pig forms. The influence of Roman breeds on the pig population was not as significant as on cattle and sheep. Roman pig remains found in towns were somewhat larger due to better husbandry conditions and fodder, although remains of small local pigs were widespread at sites throughout the whole of the Roman Period in Pannonia.

Horse

Celtic horse size was non-homogenous. In Manching and Magdelenenburg, individuals from dwarf to tall size were discovered (Vörös 1982, 136). Bökönyi distinguished two different groups within the horse population of the Iron Age: the Eastern group consists of Scythian, Greek, and Thracian horses with a withers height of around 136 cm, while the horses found at La Tène, Helvetian, Gallic, and Celtic sites formed a Western group, with withers heights of around 126 cm. Thus, according to Bökönyi, Celtic horses found on Hungarian sites were typical representatives of the Western group (Bökönyi 1964, 227–235). Remains of such individuals were found at Gellérthegy-Tabán. However, Bökönyi added that due to animal trade, the Eastern type was distributed over a large geographic area, so that sometimes larger individuals appear at La Tène settlements as well (Bökönyi 1979, 240–241). A horse with a withers height of 141.9 cm, found at the Celtic site of Balatonkeresztúr, and an individual recovered at Szakály, with a withers height of 139.3 cm, may have been brought into the area through trade of this kind, but there is no clear proof of that. However, most of the horses found at the sites studied here represent the small, gracile Western type; there was a horse of 122.5 cm size found at Corvin Square. Even though Celtic horses were generally small, there were some individuals shorter than 1 m in height. Celtic horse-keeping represented a significant first phase in the West European equestrian tradition. Despite their small size, Celtic horses were apparently looked upon with favor by the Romans for their sturdiness (Choyke

	HEAD REGION	TRUNK REGION	MEATY LIMB REGION	DRY LIMB	PHALANGES
Balatonlelle (Celtic)					
Bos taurus	37.76%	13.2%	15.09%	30.18%	3.77%
Sus scrofa f. domestica	9.32%	49.76%	16.06%	11.91%	12.95%
Ovis aries / Capra hircus	25.42%	10.16%	44.08%	20.34%	-
Zamárdi (Celtic)					
Bos taurus	25%	12.5%	12.5%	45.83%	4.17%
Sus scrofa f. domestica	63.6%	6.06%	21.7%	3.03%	6.06%
Ovis aries / Capra hircus	30.4%	17.39%	43.52%	8.69%	-
Balatonkeresztúr (Celtic)					
Bos taurus	26.6%	18.2%	19.52%	28.3%	7.38%
Sus scrofa f. domestica	26.52%	23.18%	32.42%	16.69%	1.19%
Ovis aries / Capra hircus	29%	14.77%	38.5%	17.72%	-
Corvin Square (Celtic)					
Bos taurus	24.29%	29%	18.69%	22.42%	5.6%
Sus scrofa f. domestica	35.8%	12.34%	39.55%	11.1%	1.23%
Ovis aries / Capra hircus	15.55%	31.13%	30.37%	15.55%	7.4%
Cervus elaphus	11.42%*	21.22%	27.75%	35.91%	3.7%
Balatonszemes (Celto-Roman)					
Bos taurus	36%	20%	24%	16%	4%
Sus scrofa f. domestica	64.3%	7.14%	14.28%	14.28%	-
Ovis aries / Capra hircus	16.6%	11.1%	55.69%	16.6%	-
Bécsi Road (Celto-Roman)					
Bos taurus	25%	55%	10%	2.5%	7.5%
Sus scrofa f. domestica	25.19%	35.9%	26.71%	10.68%	1.52%
Ovis aries / Capra hircus	16.66%	43.58%	32.57%	5.3%	1.89%

Table 16.4. Comparative body part distribution (at the other sites these data were either not available, or the sample size was too small (<100 pieces) for a detailed body part analysis). Red deer antler is not included.

2003, 214). The extent to which this animal was honored is clearly shown by the frequency of horse representations on coins, grave monuments, and ceramic vessels. These depictions show small individuals with long faces (Bökönyi 1988, 255–257).

The appearance of Roman military horses strongly influenced the horse population of Pannonia. In the Imperial Period, animals of Greek, Persian, and Thracian origin were used by the Roman army. Examples of these large individuals have been found over the whole area of present-day Hungary, alongside the small-sized horse population of the local inhabitants. In the assemblage discussed in this paper, however, the few horse remains rather reflect the more primitive local breed.

Dog

The late Iron Age and, especially, the Roman Period was a time when conscious breeding of dogs appeared in Central Europe, resulting in a highly variable population, including dwarf individuals (Peters 1998; 174–175, 182–183). Such dogs were found in the Celtic *oppidum* of Manching, as an initial sign of selective breeding. Deliberate breeding practices were further developed in the Roman Imperial period.

At Szakály, the complete skeleton of a dog was brought to light. The bones belonged to a bitch with a withers height of 53.4 cm. A dog with a withers height of 58.1 cm came from the Celtic layers at the site of Corvin Square. A medium-sized dog with a withers height of 53.7 cm and a relatively small dog with a withers height of 45.0 cm were recovered at the site of Balatonlelle. Nonetheless, the absence of complete crania makes the distinction of "breeds" difficult. Unfortunately, the Romano-Celtic material contained no measurable dog bones.

Red deer

In Roman Period Pannonia, a reduction can be observed in the withers height of red deer. Expansion of land under cultivation and decrease in forested areas lead to reduction of the species' habitat. Thus, the deer stock split up into smaller populations. For the Romans, red deer hunting was rather a luxurious sport of aristocrats; venison was not important in the diet. Celts sometimes hunted red deer for their meat. Red deer bones discovered at Pannonian Celtic sites are mostly bucks, which may be a consequence of selective hunting (they seem to have targeted weaker males while does were spared in order to maintain the population), or of the fact that bucks in rut are solitary, and stags gathering in the mating season could have been easier targets than the more timid hinds (Choyke 2003, 215; Bökönyi 1984, 96). In the material from Szakály, all individuals seemed to be stags (Vörös 1982, 139). At Corvin Square, not all individuals could be sexed, but most of what is available seem to be stags as well. The single complete metatarsal bone, however, belongs to an individual with a withers height of 121 cm, probably a hind.

Body part distribution and butchering methods

There was no concentration of skeletal parts on either of the Romano-Celtic sites examined here. Roman assemblages reflect the conscious separation of body parts used in the kitchen and bones from less valuable parts used for other kinds of production (horn cores, phalanges *etc.*); the latter are usually found concentrated on the spot where they were used. In the area of Aquincum, a glue-boiling workshop (the so-called Peristyl house, analyzed by the author, yet unpublished) is a good example for that kind of concentration. Meat production was centralized in Roman Aquincum; Roman assemblages show that the animals were slaughtered and then divided up by professional butchers who sold good quality meat, while horncores, phalanges, and caudal vertebrae were gathered for processing in other kinds of workshops. However, at both the romanized Celtic sites, kitchen refuse and industrial garbage were mixed. Refuse from bone-working occurs here and there in the Celto-Roman material, but it is only represented by a very small number of partially-worked pieces.

In the case of settlements, the scattered assemblages and the absence of any kind of concentration of bone finds suggest that probably all activities took place within the confines of the village, no matter what ethnic group we are talking about. This is not surprising in such rural and less centralized areas as the Balatonlelle and Balatonkeresztúr sites. However, on the Celtic site of Szakály-Réti Földek, Vörös was able to demonstrate two phases of topographical distribution: the bones remaining from meat consumption, *i.e.* kitchen midden, were deposited in the occupied part of the settlement. Old and unused settlement features contained remains of primary butchering, bones from less valuable carcass regions such as the dry limbs or phalanges (Vörös 1982, 150).

The Celtic material of Corvin Square, which contained many red deer bones, does not reflect the custom that large game was cut up at the kill spot. In many cases, the meat was wrapped in the animal's skin cut from the carcass, and only the metapodials, phalanges and skulls were brought to the village together with the meat, *i.e.*, the Schlepp effect (Perkins and Daly, 1971). However, every skeletal element occurs at the Corvin Square site in relatively large numbers. This means that deer were brought back whole to the site and cut up there.

It seems that all activities, butchering and bone working as well as making of other animal products took place within the Celtic settlement, perhaps even at the household level. This practice later continued with the romanized Celts. However, this phenomenon is highly dependent on the type of the settlement. Usually, many of the bone finds at Celtic and Celto-Roman sites are gnawed and burned, which means that the rubbish was deposited in open areas which were accessible to dogs and other animals as well as accidental fire.

Analyzing social differences or locations of butchering and bone-working was not feasible on our Celto-Roman sites because they were less intensively occupied and small. On the other hand, there is no mutual agreement on what actually constitutes poor quality meat. There is little known about the way Celtics prepared food and the evaluation of meat is relative, depending on cultural attitudes. Thus, I have used the body part distribution scheme of M. Kretzoi (Kretzoi and Gábori-Csánk 1968), which only distinguishes body parts and not the quality of meat. The body part distribution of the main species is listed in Table 16.4. In most cases, meaty limbs (the upper region of limbs) represent the biggest part of the faunal assemblage. The higher percentages of bones from the head region at Zamárdi and Balatonszemes may be explained by the extreme fragmentation of the material.

Comparison of butchering practices

There is a clear contrast between Romans, Celts, and Celto-Romans in the way these groups butchered their animals. The most interesting difference lies in the fact that Celts and Celto-Romans seem to break the bones in the ancient prehistoric manner rather than chop them; practically all long bones are were broken up for the bone marrow, displaying a characteristic spiral pattern of breakage. This method often produces tiny pieces of the diaphysis, fragmenting the material. In contrast, Roman refuse usually contains larger pieces of butchered bone (of course, lack of sieving can also result in the dominance of such fragments) with clear chop marks from cleavers. We also find cutmarks on Celtic and Celto-Roman bones, but only a very few. Typical filleting marks occur quite often on Roman bone remains but practically never on the Celtic and Celto-Roman ones. This indicates that different ways of butchering and preparing meat were maintained despite centuries of Roman presence. Inhabitants of 'suburban' villages on the fringes of Aquincum slaughtered their animals and butchered them in a way that was very similar to the methods of their Celtic ancestors; the bones display the spiral fracturing and all body parts are present. In the Military Town, available meat was produced by centrally organized butcheries, and thus, body parts are selected and bones display regular chop marks (Choyke 2003, 217).

The spots where cutmarks appear are almost the same, no matter what ethnic group the butcher belonged to. Roman butchers produced characteristic signs of butchering, because there was a need for specialized butchers and specific techniques due to the increasing demand for meat (Seetah 2006, 112–113). The body was cut up at the joints with a cleaver; the Romans also chopped the long bones of the extremities with cleavers while Celts living in villages on the outskirts of Roman settlements tend to break them instead, apparently continuing to use this method long after other aspects of their lives had been changed during the process of colonization.

Until the Marcomannic wars, the Celtic cultural heritage was continuous. However, finds that came to light from isolated Celtic settlements like Szakály-Réti Földek, show the survival of the traditional material culture even in the 2nd century AD (Szabó 2005, 179–182). Stelae and grave monuments provide an interesting addition to the picture: Celtic men, according to their clothes and names depicted on their grave stele, seem to adopt Roman traditions much sooner than the women. Celtic women kept their traditional clothes like the trapezoid skirt and the headdress for a long time after colonization began (Szabó 2005, 181). On 2nd century AD Celto-Roman grave steles from Aquincum or Tác-Gorsium men often are shown wearing togas, perhaps as a symbol of power, while the women beside them are still wearing traditional Celtic clothes (Szabó 2005, 180). Perhaps women represented a more conservative social group that was more attached to older traditions–and, since cooking and preparing meat was their duty, our finds should mainly reflect their attitudes. The chopping and methods of carcass separation are different from that practiced by Roman butchers in towns and, in fact, are the same as those practiced by the Celtic population before the Romans moved into the area.

Conclusions and Summary

Celtic and Celto-Roman assemblages indicate a continuity of tradition. Household activities, which are reflected in the kitchen refuse, represent a conservative segment of daily lifeways. Thus, continuity in meat preparation is not surprising. Even though our data are few in number, and more investigations need to be made to support these conclusions in general, it seems that the influence of Roman animal keeping was not decisive in the Early Imperial Period in Pannonia. On the other hand, Roman animals had already reached the non-Roman areas before the occupation through trade, and such individuals appear now and then in the late Celtic and romanized Celtic faunal materials. The local inhabitants maintained their sometimes quite ancient animal keeping customs and exploited a domestic livestock that was similar to their ancestors' animals, a tradition that was independent from the more developed animal husbandry practices seen on Roman urban farms. Even though there were mercantile activities which to some extent influenced the quality of the stock, some isolated villages still carried on with the old ways as late as the 4th century AD. Roman customs probably impacted the behavior and traditions of the *principes*, the aristocratic class of the indigenous tribes.

Some changes in the proportion of species in the domestic animal stock, however, can be observed. The number of small ruminants increased, and caprinae and cattle served as the primary source of meat, while pig decreased in importance. However, at Aquincum at least the Roman population was less dependent on pork than might be expected compared to other coeval Roman towns. Choyke put this down to the influx of soldiers and their dependents from the Eastern Empire who might practice some restrictions concerning pork. If the local Celtic populations also were not so keen on pork then there was a double reason for the unexpectedly low numbers of this species on these sites (Choyke 2003, 214). The use of sheep for their wool is also assumed, and Romans provided improved animals that produced a better quality, medium-fine wool (Choyke 2003, 213). The most significant traces of Roman influence can be observed in the remains of cattle and sheep, even though Roman animal keeping did not change the husbandry of local inhabitants to such an extent that it changed the quality and characteristics of most of the Celtic and Celto-Roman livestock.

Hunting was mostly for sport among the Romans and only served to supplement the diet at military forts. On the other hand, in some settlements where agriculture was not the chief economic occupation, meat from large game was an important complement to the Celtic diet. After the Romans occupied Pannonia, wild species almost totally disappear from the faunal assemblages. This can be explained by a possible hunting prohibition, but it is also possible that those settlements with extremely low proportions of large game did little hunting before the Roman colonization.

Several sites that can be connected to Celtic and Romano-Celtic populations have come to light during excavations in the past decades in Hungary, the former Roman province of Pannonia Inferior, where the Romans of the 1st century AD absorbed the Celtic peoples of the Eravisci tribe. Romans tried not to interfere too much in the internal life of local inhabitants, except as necessary to maintain control. The Romans brought different traditions of animal keeping; their husbandry was more deliberate and resulted in better quality livestock. Roman villa farms introduced the first methods of modern animal keeping, but these institutions had little influence on the unimproved local Celtic livestock. Roman animals were not completely unknown to the local Celts because they had had trading contacts with them from well before the occupation. Individual animals, probably of Roman origin, appear here and there in the bone material. However, their presence is not significant in the first phase of Roman rule. In isolated settlements, animal keeping circumstances remained unchanged even in the 4th century AD. Household activities such as meat preparation and cooking also reflect the same kind of continuity. The romanization of Celtic women seems also to have been a slow process, and preparation of food was mainly their task. Even though there is very little information on the religious life of romanized Celts, it seems reasonable that the religious attributes associated with certain animal species did not disappear but became mixed with Roman beliefs.

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17. Zooarchaeology and Colonialism in Roman Britain: Evidence from Icklingham

Pam J. Crabtree

This paper will examine the issues surrounding "romanization" in Britain, using the faunal data from the site of Icklingham in Suffolk. Icklingham is a second- to fourth-century AD site located in the Lark Valley near the Iron Age and Anglo-Saxon site of West Stow. Faunal data from the recent (1997–2000) excavations at Icklingham will be compared to the pre-Roman Iron Age farmstead at West Stow to identify the impact of Roman colonialism on animal husbandry and diet in East Anglia. Comparisons with the post-Roman (420–650 AD) village at West Stow will allow us to identify the long-term impact of Romanization on East Anglian animal husbandry.

Keywords: romanization, colonialism, Icklingham, West Stow, Lark Valley

Introduction

Douglas Orser (1996) has suggested that one of the defining characteristics of the archaeology of the modern world is the impact of European colonialism on many other regions of the world, including North America, South America, the Caribbean, and many parts of Asia and Africa. However, 15th- and 16th-century Europeans did not invent the concept of colonialism. In fact, many of the historical models for European colonialism were drawn from the ancient world. In particular, 19th- and early 20th-century English scholars and the British popular media drew analogies between the British Empire and the Roman Empire of the first few centuries AD (Hingley 2000). In 1905 Francis Haverfield pioneered the concept of "romanisation" as a way of explaining how Roman civilization was incorporated into early English history and character (Haverfield 1915). As India was viewed as the jewel in the crown of the former British Empire, Roman Britain was seen as the jewel in the crown of the ancient Roman Empire. (In fact, Britain's role in the Roman Empire may have been more analogous to Bermuda's role in the British Empire.) Nevertheless, the concept of romanization colored the archaeological study of Roman Britain for most of the 20th century (see, for example, Millett 1990).

This concept was used to explain how Britain was transformed into a Roman province. Its effect can be seen in many popular archaeological texts, such as Collingwood and Richmond's (1969) *The Archaeology of Roman Britain*, which serves as a catalogue of Roman and Roman-style artifacts and features in Britain, including forts and fortresses, mileposts, Latin inscriptions, and glass and pottery. The concept behind romanization is the notion that Roman ideas and material culture gradually replaced native, pre-Roman British culture and that this replacement took place from the top down, beginning with the upper classes who built romanized villas and town houses in the newly established Roman towns and cities.

Today the concept of romanization is highly contested. In particular, historians and archaeologists have noted that the concept of romanization may depend on rather arbitrary notions of Roman vs. native material culture. An example from outside Roman Britain can be used to illustrate this point. "Arretine" ceramics were originally produced in northern Italy. However, the industry began to move into Gaul in the first century BC. Over time, the Gaulish potters introduced many technological innovations that were not seen in the early Arretine wares from Italy. This process of change is far too complex to simply be labeled Romanization. As Gosden (2004: 106) notes, following Woolf (1998), "people in Gaul…did not adopt Roman provincial culture so much as participate in creating it."

In addition, the traditional concept of romanization focuses on the gradual adoption of Roman lifeways and material culture by the native British population. Recent cross-cultural research on the colonial encounter has shown that the process involves a much more complex and multi-faceted set of interactions between the colonizers, the native or host population and the homeland from which the colonizers came (Stein 2005).

One area in which the process of "romanization" can be studied is animal husbandry. Archaeozoological data can be useful for the study the colonial process, since they

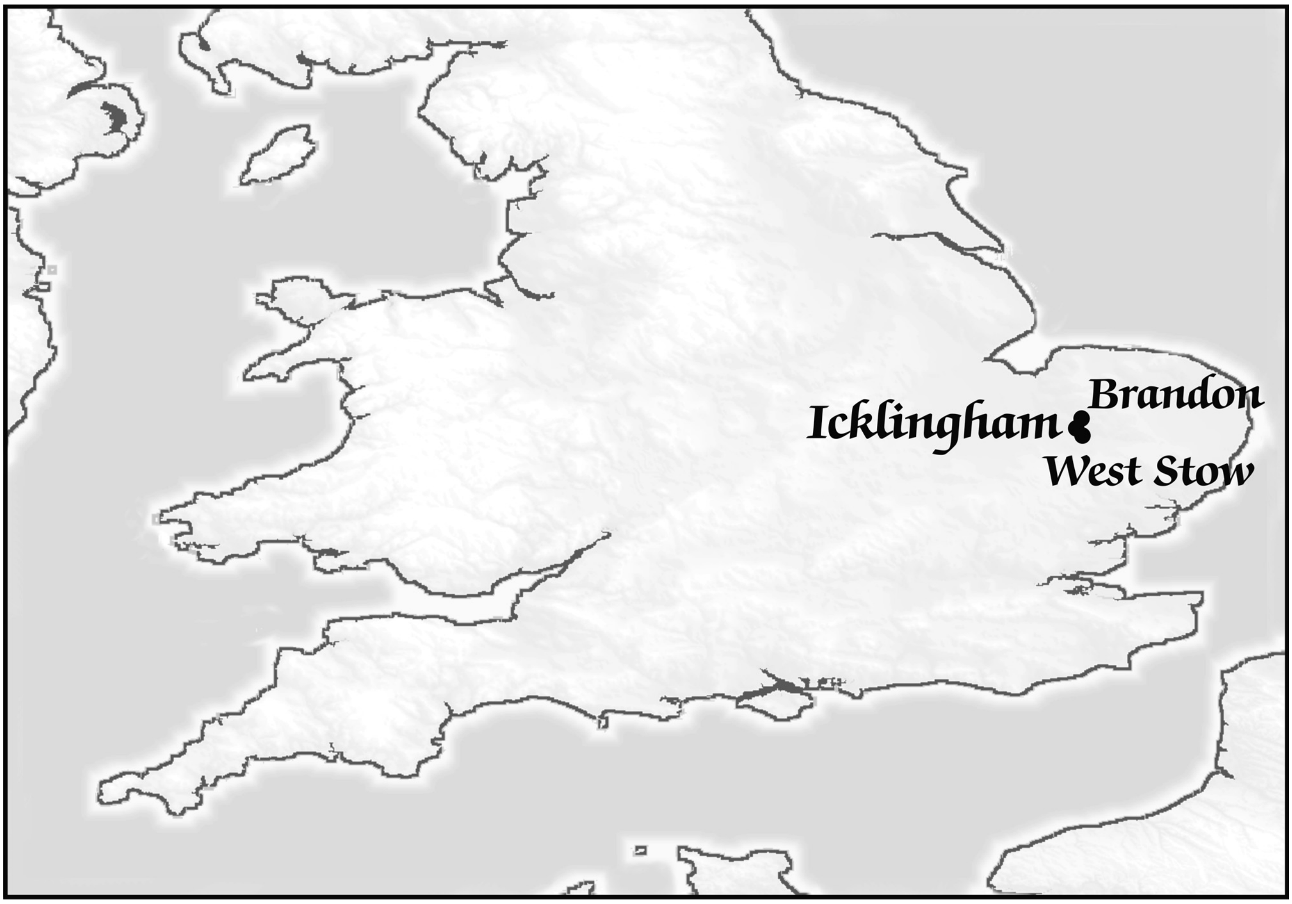

Figure 17.1. Map of southern Britain showing the locations of Icklingham, Brandon, and West Stow.

provide valuable information on the cultural context in which the production and consumption of food and other animal products takes place. One of the questions that zooarchaeologists working in Britain have asked is: what effect did the Roman conquest in the mid-first century CE have on livestock and its uses? While many early excavations of Roman sites in Britain focused on cities and large towns, villas, and military installations, more recent excavations have focused on smaller Roman towns and rural settlement where the interaction between Roman and native material culture and ideas was undoubtedly complex. This paper will examine the effects of Roman colonization on one small region of Britain, the Lark Valley in eastern England.

The Lark Valley (Figure 17.1) offers a unique opportunity to examine romanization and Roman colonialism outside the larger urban areas and the Roman military camps. In addition to the well-known Anglo-Saxon village, the Lark Valley site of West Stow also yielded a complete pre-Roman Iron Age (PRIA) farmstead (West 1990). This settlement was initially established in the 3rd century BC, but much of the material comes from the 1st century BC and the earlier 1st century AD, a period when there was substantial contact between Britain and the Roman Empire. This PRIA settlement produced over 7500 animal bones and fragments which were analyzed as part of my Ph.D. research. The nearby 2nd–4th century AD Romano-British site of Icklingham has been the subject of two different programs of excavation. The first was carried out in the 1970s under Stanley West and Jude Plouviez (1976), while a more recent campaign of excavation was conducted by Dr. Catherine Hills of Cambridge between 1997 and 2000. While the site of Icklingham was initially identified as a Roman villa because a bathhouse was discovered there in the mid-19th century, the recent programs of excavation have shown that the site is actually a sprawling country market town. I was able to analyze roughly two-thirds of the fauna from the West-Plouviez excavations in 1989 (Crabtree 1991), a total of about 11,800 fragments, and I recently completed a study of the approximately 10,200 animal bones recovered from the 1997–2000 excavations at Icklingham. This chapter will describe the results of this more recent study, including basic zooarchaeological data on species frequencies, kill patterns for the domestic mammals, animal bone measurements, and butchery practices. I will then consider what, if any, implications these data have for our understanding of Roman colonialism and the “romanization” of Britain.

Species Ratios

Both the West Stow Iron Age assemblage and the Icklingham fauna from the Hills excavations are dominated by the remains of domestic mammals – cattle, sheep, pigs, and

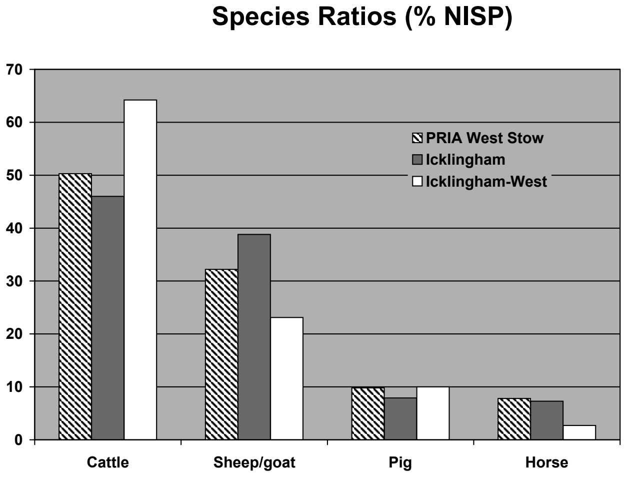

Figure 17.2. Species ratios based on NISP for the faunal assemblages from PRIA West Stow and the Hills and West/ Plouviez excavations at Icklingham.

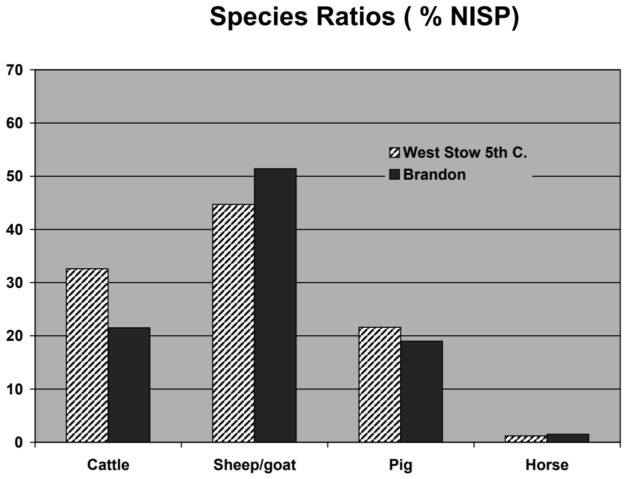

Figure 17.3. Species ratios based in NISP for faunal assemblages from 5th-century West Stow and Middle Saxon Brandon.

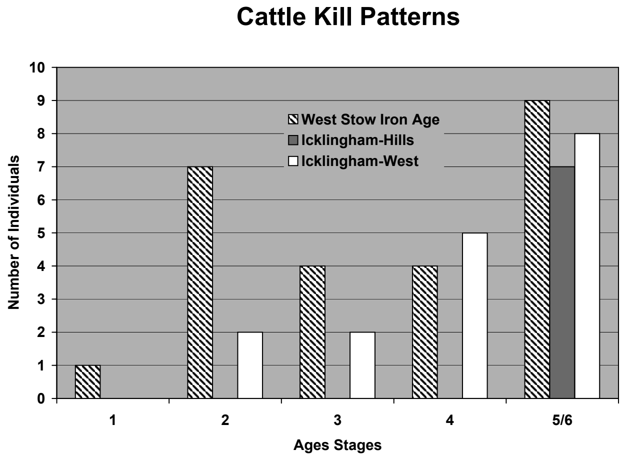

Figure 17.4. Ageing data for cattle mandibles from Icklingham and PRIA West Stow. The age stages follow those used by Bourdillon and Coy (1980).

horses. Species ratios based on NISP show that cattle are the most common animals, followed by sheep, pigs, and horses. The species ratios for the Icklingham assemblage and the PRIA features from West Stow are remarkably similar (Figure 17.2). The West-Plouviez assemblage produced a somewhat similar pattern, although this collection includes relatively more cattle and somewhat fewer horses. These species ratios differ markedly from the patterns of animal utilization seen at later Saxon sites in the region (Figure 17.3). The Saxon sites are dominated by sheep, and they include relatively more pigs, but fewer horses and cattle, than the PRIA assemblage from West Stow and the Roman assemblages from Icklingham.

Both the Iron Age collection from West Stow and the Icklingham assemblage from the Hills excavation include small numbers of wild animals that would have been available in the local vicinity. The Iron Age assemblage from West Stow includes a few bones from red deer, roe deer, fox, and hare, while the Icklingham collection includes both roe deer and hare. A small number of red deer and badger bones were also recovered from the earlier West-Plouviez excavations at Icklingham.

The biggest difference between the PRIA faunal assemblage from West Stow and the Icklingham animal bone collection is seen in the bird assemblages. The West Stow Iron Age fauna includes a small number of domestic birds and a few waterbirds and waders – chickens, geese, cranes, and a heron (*Ardea cincerea*) – a pattern that is also characteristic of the Anglo-Saxon features from West Stow. The PRIA assemblage from West Stow does include evidence for domestic chicken (*Gallus gallus*), a non-native species, that was introduced by trade during the PRIA. The bird assemblage from the recent excavations at Icklingham is quite different. While it does include small number of domestic birds and local water birds – chickens, ducks, geese, and a heron, it also includes a number of corvids – carrion crow (*Corvus corone*), jackdaw (*Corvus monedula*) and raven *(Corvus corax*), The most interesting among these corvid bones were two large raven coracoids that were associated with a human burial.

Kill-patterns and Ages at Death for the Domestic Mammals

Kill-patterns for the domestic mammals were based on dental eruption and wear (following Grant 1982, but grouped into age-classes following Payne (1973) and Crabtree (1990) for sheep and Bourdillon and Coy (1980) for cattle). The West Stow Iron Age faunal assemblage includes cattle that were killed at all stages of life, a pattern that is to be expected for a farming community, and a pattern that is also seen at early Anglo-Saxon West Stow (Figure 17.4). In contrast, the cattle mandibles recovered from the recent excavations at Icklingham are all from older adult cattle (MWS between 41 and 46), suggesting that the site may have been provisioned with cattle that

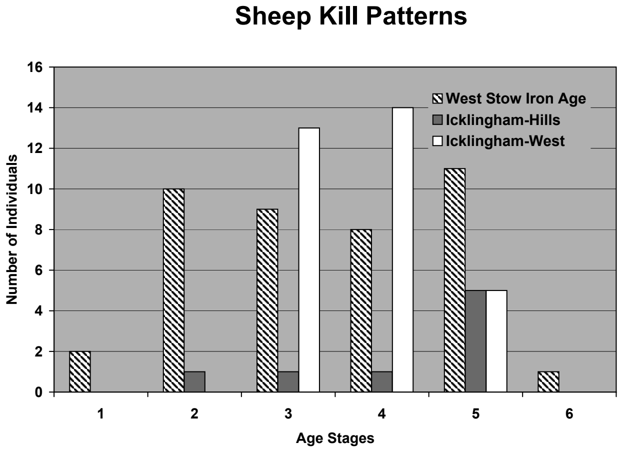

Figure 17.5. Ageing data for sheep mandibles from Icklingham and PRIA West Stow.

were raised elsewhere. The larger assemblage (N = 17) of cattle mandibles from the West-Plouviez excavations also includes no neonatal or young juvenile cattle. The assemblage includes a number of market-aged adolescent and young adult cattle, as well as many older individuals who may have been used for traction, breeding, or milking prior to slaughter.

The ageing data for sheep present a similar picture. The PRIA assemblage from West Stow includes sheep from all age classes, from young juveniles to older adults. In contrast, the majority of sheep recovered from the recent excavations at Icklingham were mature animals; no neonatal or young juvenile animals were present (Figure 17.5). The ageing data from the West-Plouviez excavations are quite similar. They include no sheep killed during the first year of life. The majority of the sheep were killed during late adolescence or early adulthood. The rest were older breeding animals that were sent to market. The ageing data for both cattle and sheep indicate that the inhabitants of Icklingham were provisioned with food, probably from the surrounding countryside. This pattern, however, is not one that should be specifically associated with Roman colonial activity or "romanization;" it is one that we certainly would expect to find at any town or city. It can only been seen as Roman insofar as the Romans established a large number of market towns, including Icklingham, throughout southern Britain.

Measurements

Zooarchaeological research in Britain and on the European continent (see, for example, Maltby 1981; Tiechert 1984) has shown that the Romans introduced larger cattle into the regions that they colonized. The metrical data from Icklingham support this contention (Figure 17.6). The largest of the cattle from Roman Icklingham are appreciably larger than the cattle from either the PRIA farmstead at West Stow or the West Stow early Anglo-Saxon village.

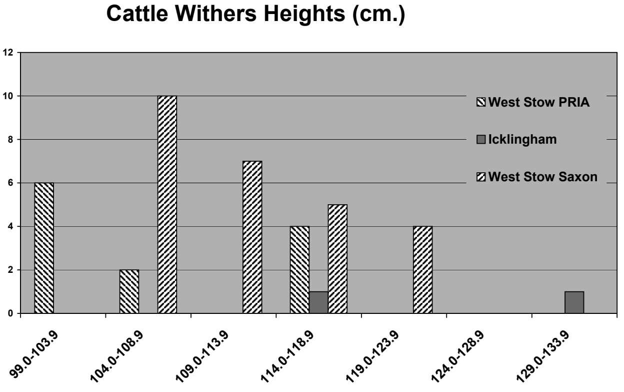

Figure 17.6. Cattle withers heights for Icklingham, PRIA West Stow, and early Anglo-Saxon West Stow.

Cattle Butchery from Icklingham -- West Excavations

Body Part	*Cut Marks*	*Chop Marks*	*Split*	*Total*
Femur	2	35	42	79
Tibia	1	19	103	123
Metatarsus	6	3	16	25
Humerus	4	24	81	109
Radius	2	21	163	186
Metacarpus	4	9	23	36

Figure 17.7. Chart showing butchery traces on the faunal remains recovered from the Hills excavations at Icklingham.

Butchery

The contrast between the PRIA faunal assemblage from West Stow and the late Roman faunal collection from Icklingham are seen most clearly in the traces of butchery that can be seen on the cattle bones. The cattle bones from Icklingham were butchered in standardized ways using cleavers or heavy knives, based on the data from the West-Plouviez excavations (Crabtree 1991, table 2). While the remains of horses and red deer were fewer in number than cattle, these species were butchered in similar ways. The smaller sample of butchered cattle bones from the Hills excavations shows similar patterning in butchery practices (Figure 17.7). The new Icklingham data show the typical splitting of the long bones and the standardized heavy chop marks that can be seen on pelves and mandibles that are commonly seen on other Roman-period sites in Britain. In short, the Icklingham fauna were butchered in standardized ways by specialist butchers. No such standardization can be seen at Iron Age West Stow. The PRIA animal bones from West Stow were butchered on an ad hoc basis by individual farmers.

Conclusions

In comparison to the PRIA economy seen at the West Stow farmstead, the faunal assemblage from Icklingham provides evidence for both urbanization and specialization. The inhabitants of Icklingham did not raise their own livestock; they were provisioned with meat from the surrounding countryside. The meat was butchered in standardized ways by specialist butchers, a pattern that has been well documented at other Roman-period sites in Britain (Seetah 2006). However, the basic character of the economy was unchanged from pre-Roman times. The species ratios seen at Icklingham are virtually identical to those seen at the West Stow PRIA farmstead. In short, the Romans urbanized the British economy in the Lark Valley without fundamentally transforming it.

Evidence for the traditional notion of "romanization" is harder to find. Two possibilities exist. First, it is clear that the Romans introduced some larger cattle to Britain. The largest cattle from Icklingham are larger than anything known from either the PRIA or the Early and Middle Saxon periods in western Suffolk. Second, the use of corvids in human burials might point to some ideological changes that are associated with the creation of Romano-British culture. However, ravens and other corvids play a more central role in Celtic mythology than they do in Roman religion, so this is not likely to be an example of classic "romanization." As other have noted, the process of creating a Romano-British culture in the Roman colony of Britannia is far more complex than can be described by the simple acculturation models known as "romanization."

Acknowledgements

I want to thank Dr. Catherine Hills for giving me permission to study the Icklingham collection and for all her support.

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PART III

ANIMAL TRANSFORMATIONS

editor
Alice Choyke

18. The Bone is the Beast: Animal Amulets and Ornaments in Power and Magic

Alice Choyke

In parallel with the more practical aspects of the human-animal relationship revolving around subsistence or draught power, people have always endowed the creatures surrounding them with various human characteristics. For most of the pre- and proto-history of continental Europe there are few written sources to tell us details about the way different peoples thought about the animals in their world, and the stories they told about them. Amulets and ornaments from cemeteries and settlements made from skeletal elements have the potential to illuminate which animals were considered significant or special. Individual bones were thus transformed in the minds of their users into the whole animal with all its special attributes and cultural associations. One universal running through these bones is the overwhelming use of head and foot bones to represent the essence of the animal. Teeth of red deer, dog, wolf, bear, boar and lion are of particular significance in this regard. Various bones from the foot, in particular the astragali or the metapodia of hare and dog reflect the way animals moved. The paper will include a review of the various kinds of amulets and ornaments found in the Central European area, looking for common threads. A burial from a late sixth-century AD Hunnish context will be examined in detail. The archaeological data will be compared to the way the 'power of animals' has been harnessed as part of risk reducing, magic strategies in various parts of the world to create a model of how this may have worked in the past. The parallel use of mental constructs of animals in representing various social identities will also be explored.

Keywords: Animal species, skeletal elements, amulets, mental constructs, power, magic, Europe, Eurasia

Introduction

Human-animal relations in both the past and present are enmeshed in a complex bi-lateral web of interactions, informed on the human side by story and myth incorporating animals as metaphors for human behavior. However, Douglas (1990, 26–7) has warned that "the practice of referring to two objects metaphorically constitutes their similarity" rather than the other way around. In turn, she suggests that humans understand animals to be acting according to the same principles as themselves (Douglas 1990, 36), this concrete understanding is, however, often expressed in metaphor. At the same time, ascribing meaning to metaphoric treatment of skeletal elements based on what we, scholarly outsiders, see as similarities between the known natural attributes of animals and their use in feasting and magic is a dangerous business. Attributed similarity is culture-bound. Here, I only argue for recognition of the phenomena in archaeological materials and avoid direct explanation except where some textual source still exists.

Although today in the West people are perhaps less conscious of this phenomenon, we nevertheless ascribe a whole series of human characteristics and motivations to the animals that surround us. We may directly associate with animals such as domesticates or wild game, live closely with them or imagine them from a distance. Every society assigns a whole series of culturally specific attributes to these animals, ideas that reflect society itself. In Western societies, mostly positive human emotions are ascribed to horses, dogs and cats while, for example, rats and pigs are rarely seen as positive animals – either in the language of metaphor or in stories. The cartoons our children watch are filled with anthropomorphized animals with the venerable Mickey Mouse, standing on two legs and vocalizing. The appearance of such an unlikely mouse is directly contrary to what we know to be true of actual animals. Yet these storybook creatures have a reality of their own in our minds that is often reflected in the way we ascribe our own very human emotions and reactions to the 'real' animals.

Metaphors are an intrinsic part of daily speech and animals, together with our beliefs about them, and play a central role in language (Sadler 1981, 158). We might say, 'turn turtle' or 'play possum' reflecting 'hard-wired' animal behaviors on social situations 'hare-brained' humans are involved in. Animals appear as adjectives implying human characteristics such as 'foxy', 'catty' or 'wolfish'. Animals names, even today, can be used as epithets, apparently often negative, in 'worm' or 'pig' or 'rat' and, more rarely, positive as in 'lion' or 'graceful as a swan' (Sadler 1981, 159). Again, all these species are ascribed human characteristics by the transformative power of the human mind and imagination.

Archaeozoological finds have the potential to provide data illuminating some aspects of the way humans have always transformed the biological animal into a creature shaped into an all too human form. As Chapman and Gaydarska (2007, 2–10) rightly point out, the assumptions that all depositions of archaeological material are refuse from accident, discard, and abandonment is indeed questionable. Some portion of the variable patterning appearing in faunal assemblages from time to time must certainly be ascribed to conscious human behavior related to particular beliefs about the animals in special deposits (see Morris this volume). It is fair to assume that the animals chosen for sacrifice or as part of a feast at many past settlements were associated with a variety of human characteristics through the medium of stories and totemic associations. In this sense, animals occupy a liminal position in the human world, floating in the mind's eye between practical creatures exploited for food, raw materials and draught power and symbolic and metaphorical beings possessing special attributes and powers. Douglas (1996, 12) has described symbols in everyday life as regulators or channels of power. Such symbols must have existed in all societies both past and present as a way of understanding the world and human behavior within that world. These symbols, animal or otherwise, are integrated into magic and ritual as an effective way for individuals to control events in their own lives (Douglas 1996, 18).

Thus, animals appear metaphorically in language, in ritualized sayings, proverbs and even in various kinds of spoken charms in daily life. However, the stories and ideas surrounding animals were also materialized as part of ritual feasting, sacrifices, and the use of their parts to make special objects of power (Pétrequin and Pétrequin 2006). Of course, it is not possible to know the precise nature of the beliefs surrounding certain animals in cultures before written sources existed. However, once textual and iconographic evidence become available for scholarly perusal, there is ample proof of the myriad ways in which animals were transformed into altogether human-like creatures. For the prehistoric archaeologist this information, partly supported by the ethnographic record, can be used as indirect analogy when studied together with patterning and archaeological context.

Animals as Symbols

The literature on mental transformations of living animals into cultural constructs is quite large, spanning art historical, anthropological, and literary interpretation. It is clearly impossible within the confines of this short paper to review the multi-disciplinary discourse of the past 150 years. Here, instead, I would like to give examples from archaeozoological materials reflecting a few of the ways animal have been materialized as symbols within the context of human behavior.

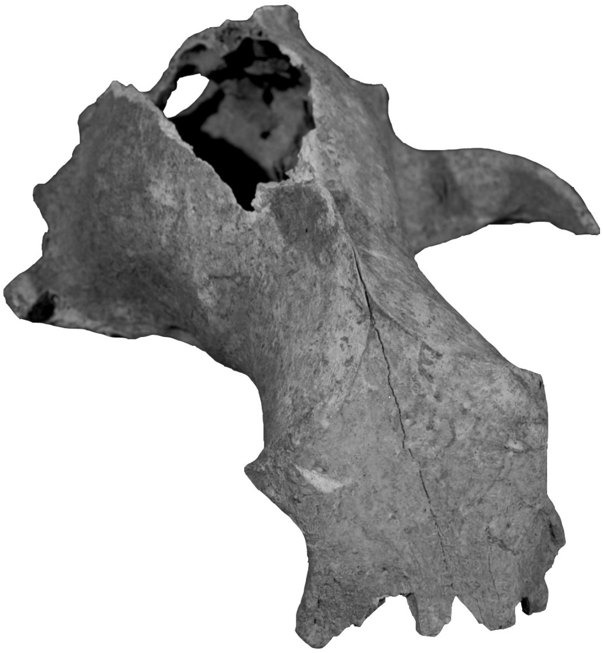

Figure 18.1. Wolf calvarium from remains of a first century AD hut, occupied by the first Roman troops arriving in Pannonia Inferior. It was found just outside the southern edge of what was to become Aquincum, the provincial capital. District III Budapest, Hungary, (Photograph by Péter Komjáthy).

The Romans leaned heavily on wolf imagery to express ideas about their own origins and their innate ferociousness. The wolf first appeared in a symbolic, protective character in the origin myth of the Romans. Romulus and Remus were saved and nurtured by a she-wolf. Subsequently, this motif could be found as a powerful symbol lasting many hundreds of years in a variety of media across the empire to remind Romans of their common origin. It is well known that Roman soldiers sometimes wore bear or wolf skins with part of the cranium attached over their helmets or body gear. In the first century AD, one of the soldiers to enter the area of what was to become the capital of the province of Pannonia Inferior, Aquincum, left this wolf calvarium behind in a small hut of the kind used by the first Imperial troops entering the region (Fig. 18.1). Much later in the Late Middle Ages of sixteenth-century Hungary, hussars wore leopard skins with the maxillary canines still attached. Here, these high-ranking officers 'borrowed' the ascribed fierceness of the leopard and the status of the exotic character of this great African cat (Bartosiewicz 2001)

Eggs frequently have protective, symbolic meanings in ritual behavior. There are many examples, even in more recent societies. Eggshells, in popular Balkan folk beliefs, have apotropaic power against witchcraft and the

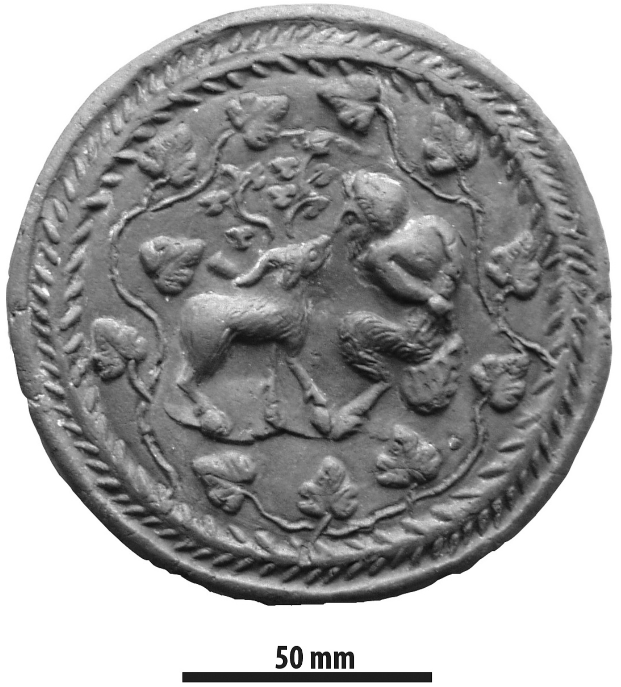

Figure 18.2. Second-third century AD Roman honeycake mold with a humorous depiction of a satyr kissing a goat. From a workshop in the Civil Town of Aquincum, Budapest, District III, Hungary. (Photograph by Péter Komjáthy).

evil eye; even the egg itself is regarded as an amulet. In Montenegro, the custom still exists to smash eggshells. If the shells were left as two halves, the spirits of witches were believed to use them as boats. In some parts of Bosnia and Herzegovina, when eggs were being broken on the eve of White Shrovetide for making pies, all the eggshells were stuck on a small twig of hazel wood, reciting the incantation: "Not the eggshell did I stick, but the witch!" (Vukanović 1989, 222). The appearance of egg shell together with an iron knife, also a material considered to have apotropaic qualities, in foundation sacrifices under upside down vessels in fourteenth-century village sites in Hungary clearly indicate their protective aspects (see Daróczi-Szábo this volume). The goose egg left on the breast of a Roman woman in an second-third century AD burial in a cemetery in Aquincum in Budapest, Hungary is possibly another allusion to the protective aspect of eggs. The use of goose egg in this Roman context may also be an allusion to the story of the Capitolium Geese of early Rome. There, the honking of the geese alerted the citizens of Rome to a sneak attack by their enemies, thus, saving them. The territorial instincts of geese merge with origin stories to situate the goose (and therefore its egg) as an animal with protective powers.

In all these appearances of animals or their parts in stories, animal qualities are conflated with those of humans. Sometimes this merging was made explicit as in the cartoon characters mentioned above. There is a long tradition of merging animal and human characteristics creating powerful beings like Horus, the Egyptian god with the head of a hawk or the Minotaur, a being with the head of a bull and body of a man. Roman and Greek mythology featured Centaurs, half man-half horse, and playful, lusty satyrs, half man-half goat (Fig. 18.2). These mythological creatures make absolutely explicit the way animals may be used as metaphors for correct and incorrect social behavior.

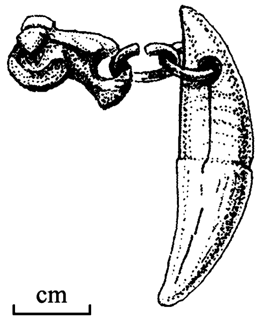

Figure 18.3. Amulet of dog canine chained to hare astragalus from Roman Iron Age site of Varbola in Estonia; in collections of Estonian National Museum, find number ERM 1941:28 (Tamla and Maldre 2001, fig. 20, with permission by the authors, drawing by Kersti Siitan).

Changing Contexts – Changing Meanings

Ideas about animals have never been static or unchanging. The stories were constantly re-interpreted and continuously transformed in evolving social contexts and by the ever changing cultural interactions between people and animals.

A nice example of the changing nature of animal transformations is the lucky rabbit's foot. Today, people in North America carry this little furry paw, or dangle it from their car mirrors. Yet it is clear that this simple amulet now derives its power from tradition rather than a set of concrete, ritually attested stories from some elegant mythological past. Brown hare (*Lepus europaeus*) astragalus amulets appear on sites and grave contexts of the Roman Iron Age in Estonia, in one known case connected with a chain to a dog canine (Tamla and Maldre 2001, 374, fig. 20) (Fig. 18.3). These amulets also appear elsewhere in the Roman Iron Age in Europe and parts of Eurasia (Luik 2010). The symbolic coupling of the dog (hunter) and hare (its prey), which continues quite late into the medieval period, thus, seems to be a very ancient one.

Elsewhere, numerous Avar Period (end of the seventh century AD) amulets have been noted in women's and children's graves (Balint 1975, 53–54, 63; Vida 2002, 199 Plate 2/3, 203 Plate 8B/5–6). Necklaces of hare metapodials and, in one case, mixed metapodials of hare and dog were found in three separate Avar Period (seventh century AD) graves in Hungary. Similar necklaces have been found in fourth-fifth century AD graves of the Satovo-Majak Culture north of the Black sea in the Ukraine between the Don and Donyec Rivers. In all cases, the hare and dog metapodials were misidentified as bird bone (Balint 1975, 63) or not identified at all (Vida 2002). Other skeletal element amulets occasionally found in women's graves of this period include a string of eight snake vertebrae, a string of four cattle incisors, dog and bear canines, wild boar tusk pendants, a dog calcaneous, a porcelain cowrie, a fresh water snail and a water worn sea shell (Vida 2002, 199, 203).

However, Melinkoff (2002, 78) also reports on medieval views of rabbits on their own (*Lepus europaeus* or *Oryctolagus cuniculus* – it may well be that Roman sources are actually referring to brown hare but scholars have often translated *lepus* as 'rabbit' since this is a species more familiar to modern urban dwellers) as averters of evil and bringers of good luck. In AD 400, Marcellus of Bordeaux wrote that the rabbit's foot should be considered lucky, healing, and protective: "Cut off the foot of a *live* (my italics) rabbit and take hairs from its belly and let it go. Of those hairs or wool make a strong thread and bind it [along] with the rabbit's foot to the body of the patient and you will find a marvelous remedy. But the remedy will be even more efficacious, so that it is hardly credible, if by chance you find that bone, namely the rabbit's ankle bone, in the dung of a wolf." Marcellus further recommended that in releasing the rabbit one should say "flee, flee, little rabbit and take the pain with you" (Melinkoff 2003, 78). Thus, in the Early Middle Ages, the rabbit's foot, through ritual and the attributed characteristics of the rabbit (or hare?) was imbued with special living powers – Mauss's fairy-like character which he attributed to special gift objects that were passed from person to person taking on attributes of the people known to have possessed them (Mauss 1950, 57). Malinowski (1939) also pointed out that objects have social lives. These 'material' lives were set in motion, circumscribed, animated, and integrated into the society that surrounded them and the cultural traditions they were a part of. Objects made from sensate beings, animals, must partake of this animated quality even more intensely. Mary Douglas (1970 [1996 edition]) describes the role of symbols as social regulators in everyday life or channels of power, although she is not referring specifically to symbols made concrete in material objects. She makes the interesting suggestion that when social bonds within a group are tight and strictly regulated, sacramental religious behavior also becomes more ritualistic. Thus, interest in magical efficacy incorporates the strength of social ties so that not all religions have a strong magical component (Douglas 1970, 44), literally in this case within the interpreted animal body part.

These traditions seem to be long-standing in Europe, with images of rabbit attired as healers found in medieval iconography. There are a few scattered hints that belief in the apotropaic character of rabbit feet continued in later times as well although there is little evidence for this beyond occasional references. Opie and Tatum (1989, 193) quote Reginald Scot who recorded in 1584 that people carried a hare or rabbit foot (again note the confusion between the two genera in urban popular culture at that time) to protect from cramp or arthritic complaints. Indeed the famous diarist of the 17th century, Samuel Peyps, contains an account of the way he (Peyps) cured himself with a hare's foot (Boyle 1973, 324–25). Obviously, this notion connecting rabbits or hares to healing still existed in popular beliefs. Settlers in North America in the seventeenth century would have carried the idea of the lucky, protective rabbit's foot to their new homeland. However, the idea of the rabbit's foot was transformed again as it encountered African magical traditions among slaves in the New World, who retained many common magical ideas brought from their West Africa homelands.

Niles Puckett (1926) collected numerous North American folk versions of how the rabbit's foot should be collected, once again incorporated in a prescribed ritual. In most cases, he reported that the rabbit should be shot in a graveyard, at midnight, under a full moon by a red-headed black man. The left (sinister) hind foot of the rabbit was the efficacious one, the one imbued with magical power. These are catalogs of traits that in the ritual were normally considered negative As Ellis (2002, 60) put it, "Bringing all of these unlucky elements together into a metonym of ritual murder marks the fetish as a powerful concrete representation of all these folk beliefs." Furthermore, as in the Marcellus story, the most efficacious rabbit's foot was obtained from a still-living animal. This suggests that what made it particularly powerful was that the severed foot continued to retain the living essence of the poor rabbit.

Today, however, social bonds in western society have become much weaker, more diffuse. Thus, the powerful rabbit's foot amulet or fetish, with its ancient roots in European healing and African magical customs, devolved into a casual use of multicolored paws hanging from key chains. This loss of ritual and belief encapsulated in a particular animal body part is predicted by Douglas's model of the way ritual and strong social bonds are intertwined. Archaeologically, however, the use of rabbits' feet would appear to have been continuous and uninterrupted from Late Roman times to the present.

Skeletal Elements with Special Powers

In this discussion of animal transformation it should not be forgotten that specific skeletal elements from particular animals also were often attributed particular powers. There seems to be a widespread belief that bones with natural holes could 'hide' powerful spirits. This belief can be found in ancient Mongolian writings (Birtalan 2003) and folk beliefs in parts of the Balkans (Vukanović 1989). In her fascinating linguistic study of early Mongolian texts, Birtalan actually reveals a huge range of largely apotropaic beliefs associated with different parts of the animal body. Such ideas about the power inherent to different parts of animal physiognomy are not likely to have been restricted to Mongolia. It has even been argued that food avoidances or preferences for food consumption of particular body parts over others even today (Bartosiewicz 1997) reflect such belief systems in action.

The scapula was the skeletal element of choice for prophetic writing on the so-called oracle bones in China

(Tedlock 2001) and considered the most 'respected' bone in terms of meat preferences for matrilineal guests at traditional feasting in Mongolia (Birtalan 2003, 37). In Hungarian folk culture, scapulae placed on the rafters of a house protected it from bad weather. Szynkiewicz (1990, 74) also mentions the special role given to sheep tibiae among pastoralists in Mongolia. He links the tibia to the origin of the people and beginnings of the descent system which may explain why meat from the tibia region was rather served to men (representing patrilineal descent) and the tibia may not be simply thrown away after the meal but must be burned. These bones are involved in rituals in all life stages and represent a shared asset by married couples (Szynkiewicz 1990, 76). The limited types of skeletal elements chosen by witchdoctors for divining were not obtained randomly but derived from special occasions, from sacrificed animals, from feasting, from particular animals, or even picked out of wolf dung as in the Marcellus story mentioned above. Although from the Mongolian example it is clear that any skeletal element could be ascribed special powers, it seems that bones from the head (especially the mouth with the teeth) and feet were particularly sought after for amulets, as bones of power. Perhaps this was because these skeletal elements best reflect the eating, defensive habits and styles of movement of particular animals and thus represent them best. Teeth and jaws are clearly important for feeding. They are also used in display, defense and attack. Claws and talons are important for defense and attack. Foot bones (for example, see Vretemark and Sten this volume) and particularly the astragalus (called the "jumping bone" in Hungarian) with its compact shape in the hind feet, are closely tied to animal movement.

Astragalus in Transformation

No discussion of animal transformations would be complete without at least a brief mention of the animal astragalus. Many authors have written exhaustively on this most mysterious of skeletal elements with its apparent universal fascination for people across Eurasia from at least the Bronze Age to the present (Dandoy 2006; Poplin 1984; 1992; Bartosiewicz 1999). Use of the particularly symmetric ruminant astragali in divination seems to be widespread. Included here are a few other examples of the explicit way this skeletal element may be used.

In Mongolia and indeed all of Central Asia there is a well known traditional game with numerous variants. There is no doubt that this game has deep roots in the region. A cache of caprine astragali was recently found in excavations at a medieval fort in Khazakstan (personal communication Maxim Mordovin 2008) and the 16th century Ottoman Turkish Period fort of Szolnok in central Hungary (Kovács 1989). In Mongolia a number of varieties of the game are played even today with up to 30 caprinae astragali (Fig. 18.4). Each side of the astragalus is assigned an animal species meaning. Horses were given the most value followed by camels, then sheep, and finally goats. Clearly, it is easier to throw the astragalus so that the broad, flat side comes down compared to the medial surface. Values are assigned according to the difficulty of the throw (http://www.un-mongolia.mn/archives/ger-mag/ger-5.htm, last accessed June 20, 2007).

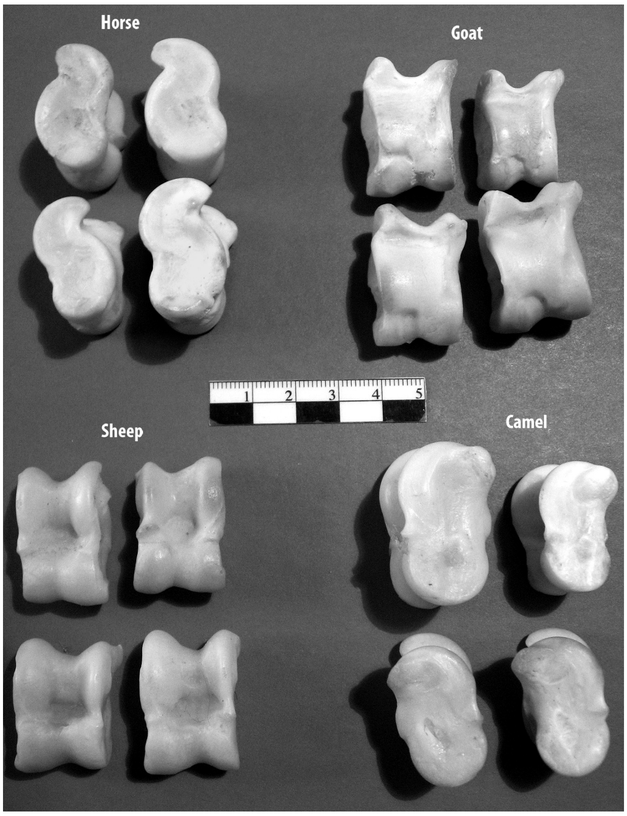

Figure 18.4. Modern-day 30 piece game set from Mongolia. Mixed sheep and goat astragali arranged according to the values of animal species their sides represent. Clockwise from upper left: horse, goat, camel, sheep. The more difficult the throw, the more valuable the species indicated. (Photograph by Alice Choyke).

Manipulated bone/antler amulets, talismans and fetishes

Ellis (2002) has described the use of rabbit's foot among slaves as fetishes, objects culturally invested in magical properties, an object specially constructed to carry social power. The production and use of such magical objects lies within the broader context of the language of belief and analogy in a particular social setting. The animal is ascribed human characteristics (Ellis 2002, 53) related to characteristics normally assigned to people in terms of their age, gender and status affiliations determining who could receive, carry and manipulate such objects to achieve a particular goal. Archaeologically, such person-amulet connections are only clearly expressed in burials. Thus, a material object, a fetish or amulet can be presented as an equivalent and condensed, concrete substitute for a range of religious and cultural beliefs (Ellen 1988, 358). Animal parts, skeletal elements in this case, are good examples of such belief 'condensations', which, like the lucky rabbit's foot, underwent reinterpretations over time and space as they were introduced and copied into a variety of cultural contexts assuming temporal continuity and/or geographical diffusion.

Amulets made from various skeletal elements reflect the so-called *pars pro toto* principle where the whole animal is represented by a part. In the late nineteenth and early centuries, a number of scholars were collecting information on folk tales and amulets across Europe (Wilson 1891; Hildebrand 1906). These works comprise lists of objects and their purported efficacy. For example, a record from 1823 states that the teeth of the red deer stag were supposed to prevent palpitations of the heart. More recently these red deer canines were worn as amulets against toothache and, by hunters, also for good luck in the hunt (Ettlinger 1965, 112). The so-called Natterbeten (adder-rosary) should also be mentioned. Venomous adders, common in mountainous and wooded parts of Austria and Bavaria, were caught and put to death in a closed pot. The bodies were then placed on an ant hill where the ants ate them clean. The vertebrae were strung on a red cord, with beads, marking the decades of the wearer's life. Probably this aspect of mixing apotropaic qualities and marking different kinds of social time in beaded necklaces is a very ancient practice. The Natterbeten was believed to protect mother and infant during childbirth. It was tied to the cradle or the child's bed to ward off diseases or other dangers (Ettlinger 1965, 115).

Imitation – Powerful Transformations into Bone

Archaeologists often consider objects made from bone, antler and canine teeth/tusks as having been a 'cheap' raw material, readily available for the production of tools and ornaments. However, as we have seen, even today these osseous materials are not at all neutral in terms of their symbolic meaning. The makers and users of special implements of all sorts must have had a clear concept of the social meanings embedded in the raw materials they exploited (Choyke 2008, 5). The special traits they attributed to the particular animal species supplying the raw materials were probably intertwined with layers of meaning in these special objects. Some of these layers of meaning would have been unconscious, others conscious but considered too obvious for discussion while others would have represented deliberate, conscious manipulations of symbolic reality (Choyke 2008, 6).

One possible example of such transformations of objects into bone from other raw materials are special bone projectile points regularly found buried in pits on sites of the Middle Chalcolithic Proto-Boleráz and Boleráz cultures in western Hungary (Fig. 18.5). Elsewhere, these angular points have their equivalents in metal (Pape 1982). The freshness of the manufacturing striations on the surfaces of these objects and surface polish suggest they were carried in pouches as objects of power rather than actual projectile points (Choyke in press). Bones from traditional divining sets studied by Ina Plug in South Africa were worn smooth from long use and contact with the leather or woven grass pouches in which they were kept (Plug 1987, 58). At some point, the Chalcolithic projectile point/amulets from Hungary were buried in closed pits within settlements, either intact or with their stems deliberately snapped. Plug (personal communication 2008) has noted that the objects in divining sets were considered very powerful and therefore dangerous. When the witchdoctor died without someone to succeed him, the sets were traditionally buried and therefore removed from circulation, to avoid polluting contact with them. The Chalcolithic points were made from the long bones of large ungulates in the size range of large cattle or aurochs.

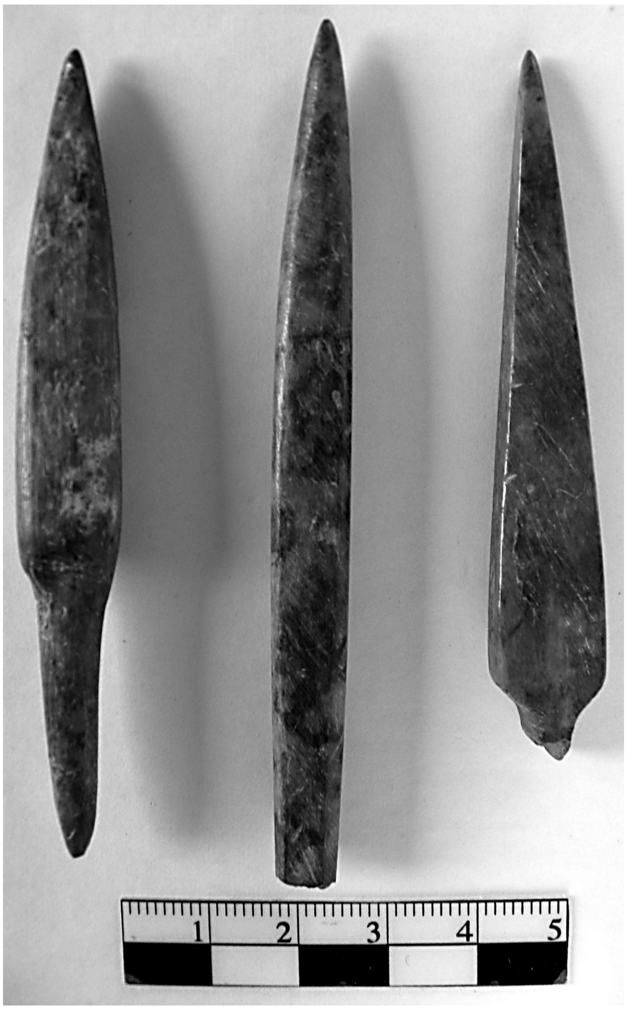

Figure 18.5. Bone projectile point amulets, imitations of metal variants from the Middle Chalcolithic settlement of Győr–Szabadrét-domb in Hungary. Use wear and freshness of manufacturing wear points to them having been kept long-term in some kind of pouch and possibly deliberately buried within the settlement. This is a recurring phenomenon at other coeval sites in Hungary (Photograph by Alice Choyke).

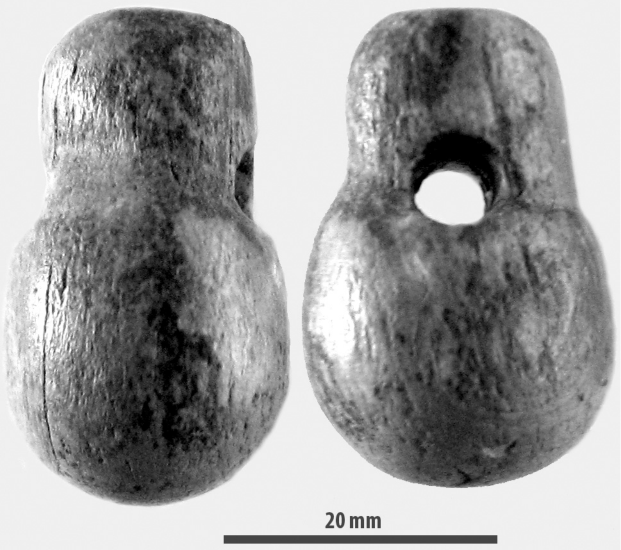

Figure 18.6. Middle Chalcolithic imitation red deer canine amulet made from aurochs-size long bone diaphysis (identification with László Bartosiewicz). Found around the neck of a 3 year old child placed in one of two ritual pits with other human and animal remains at the settlement of Abony 36, Turjányos-dűlő in Hungary (courtesy Márta Daróczi-Szabó, photograph by Alice Choyke).

Imitation of Skeletal Elements as Added Emphasis

The canines of red deer, usually developing only in males, have been used and imitated across Europe since the Upper Paleolithic. In Hungary, examples of such imitations can be found in Late Neolithic grave contexts. These appear as propeller shapes that when strung and fitted across each other in perpendicular positions appear like a densely packed ornament of deer canines often mixed with marble, *Spondylus,* or *Dentalium* beads (Choyke 2001, 252–254). They were buried with females only. Real teeth were given to women past menopause, as well as men. The varying levels of wear on individual beads within the ornaments indicate that they were passed from the costume of living individuals to compose ornaments from the deceased, thus, potentially enchaining generations. Not every female received such necklaces suggesting that their use was also related to totemic significance for certain segments of the village population (Choyke 2001, 257). Recently another later example of an imitation of a single red deer canine was found at the Proto-Boleráz, Chalcolithic site of Abony 36, Turjányos-dűlő in Hungary. It was placed around the neck of a two to three year old child, buried in one of two 'sacrificial' pits. These pits contained other human remains as well as the complete skeletons of animals. The imitation canine was carved from bone. The size of the bead and its concentric patterning related to several layers suggest that it may have been cut out perpendicularly from the long bone diaphysis of a aurochs-size animal, probably from the radius which has the thickest cortical bone (thanks to László Bartosiewicz for help with the identification) (Fig. 18.6).

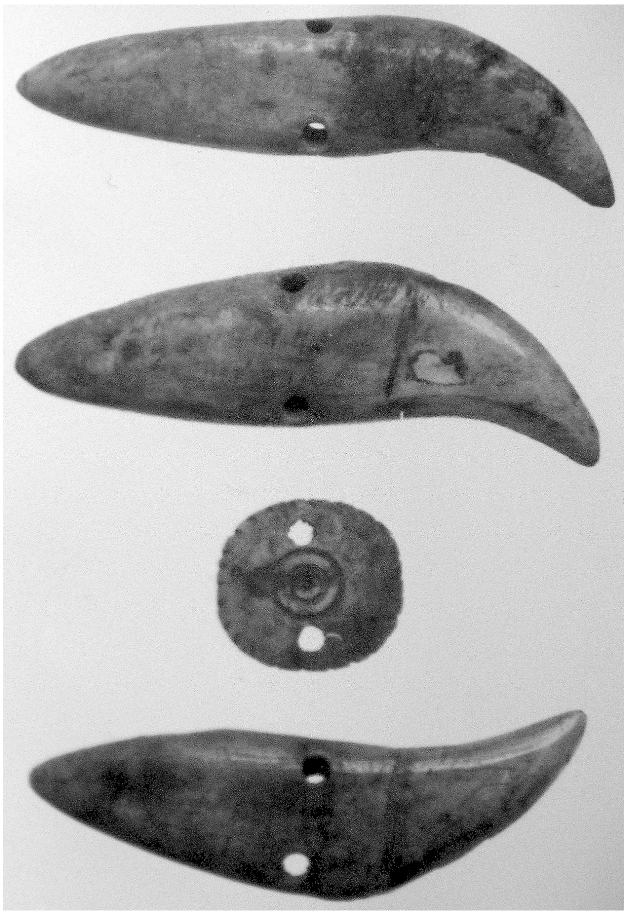

Figure 18.7. Imitation bear canine amulets manufactured in bone to be sewn on clothing found in grave of a Roman soldier in the Western cemetery of the Aquincum Military Town in District III Budapest, Hungary (Photograph by Péter Komjáthy).

Another, still later, example of skeletal elements imitated in alternative materials, comes from a second-third-century AD grave from the Western cemetery in the military town of Aquincum, then capital of the Roman province of Pannonia Inferior. In this period, army officers came from many different places in the Empire, some bringing their own special magical beliefs into the grave, beliefs foreign to official Roman traditions. Here, a pair of bear teeth, carved from bone and re-modeled to allow them to be sewn on clothing, were found with the deceased man (Fig. 18.7). There are parallel finds from the same period in Gorsium in central Pannonia (Biró 1987, 31) an example from an unknown context held in the Landesmuseum of Mainz (Mikler 1997, 20, 123, table 8) as well as real and imitation bear or lion teeth from various contexts in the Roman town of Augusta Raurica in Switzerland (Riha 1990; Deschler-Erb 2000, 325) and Bad Wimpfen in Baden-Württemberg in southern Germany (Frey 1991). Mikler describes these teeth as having an apotropaic character, while Deschler-Erb suggests bone was substituted for the real thing because it was more easily procured than actual bear teeth. However, it is also likely that copies could be modeled to be more easily sewn onto leather or textile with

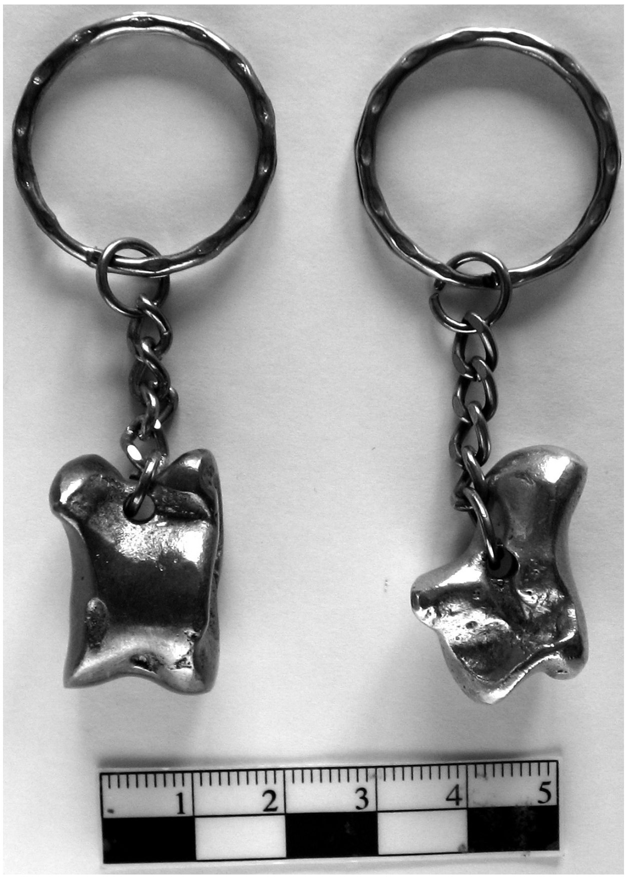

Figure 18.8. Modern-day Mongolian imitations in bronze of sheep and 'wolf' astragali (from left to right) from key chains. Known from the Iron Age, they were hung from horses to protect them. Today, they are hung in the cab of trucks – most of the cosmological background has been lost. (Photograph by Alice Choyke).

the imitated form retaining the powerful protective qualities of a real bear (Choyke 2008). As tackling large carnivores has always been a risky enterprise, imitation canine teeth were not unique to the Old World. "Fake" jaguar fangs carved out of sea shells by the Sinú (AD 1100–1500) in Columbia are kept in the Museum für Völkerkunde in Vienna (Bartosiewicz 2006).

Examples of imitation animal teeth and astragali in bronze appear in the northern Iron Age across Europe and Asia in a zone extending from the Baltic countries into Mongolia (Luik in press). Book 1 in *The Secret History of the Mongols*, written after the 1227 death of Genghis Khan, contains an example of bonding symbolized by this bone: Jamuka gives the young Temüjin a "roe deer ankle bone", who reciprocates by presenting him with a copper copy of the same type of bone (Ligeti 1962: 37). The custom of hanging bronze caprine and 'wolf' astragali on horses was attested in Mongolia from the Iron Age, but today such amulets still hang in the cabs of modern trucks to afford drivers protection during trips (Fig. 18.8). Like the lucky rabbit's foot where much of the 'story' has been lost today, these objects no longer carry the weight of metaphor based on explicit folktale narratives. Rather, it is tradition that lends them their protective power. It is likely that the protective power ascribed to the animal, represented in these imitations by its foot or mouth part, was amplified by producing it in a valuable metal (Choyke 2008, 8).

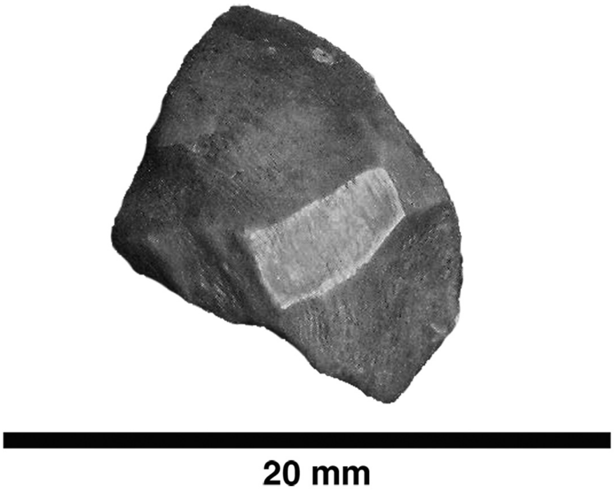

Figure 18.9. Piece of heavily handled, fragmented late Middle Bronze Age bone, possibly from a worked object. Fresh manufacturing wear, color and high polish suggest this object was handled and kept long-term in a soft pouch of some kind. From the tell site of Százhalombatta–Földvár in Hungary. (photograph by Alice Choyke).

Fragmentation and Bone Amulets

There is another unique object coming from the late Middle Bronze Age levels at Százhalombatta–Földvár (Choyke in press), this time a fragment of an object displaying signs of long-term use. The amorphous object looks like part of some kind of tool or ornament that was kept in a pouch or soft container, rounding all the worked surfaces and obscuring the manufacturing striations (Fig. 18.9). The surface of this small piece of bone shows signs of deliberate fragmentation as well as a high degree of handling polish. Perhaps bits of the original object were distributed after the object was broken up as a form of social enchainment, a practice which has been suggested for Chalcolithic ceramic material from Bulgaria (Chapman 2000, 226; Choyke and Daróci-Szabo 2010).

Early Medieval Amulets – Movement and Transformation

Amulets from animal skeletal elements appear regularly in grave contexts in Migration period and early medieval continental Europe. Their use seems to have been common from earlier Iron Age times across Europe and Eurasia, becoming more important again with the end of Roman cultural influences. The Great Migration period was a time of rapid and complex movement of ideas and humans. Use of amulets from skeletal elements and their imitations follow the movements of these various Germanic and eastern peoples.

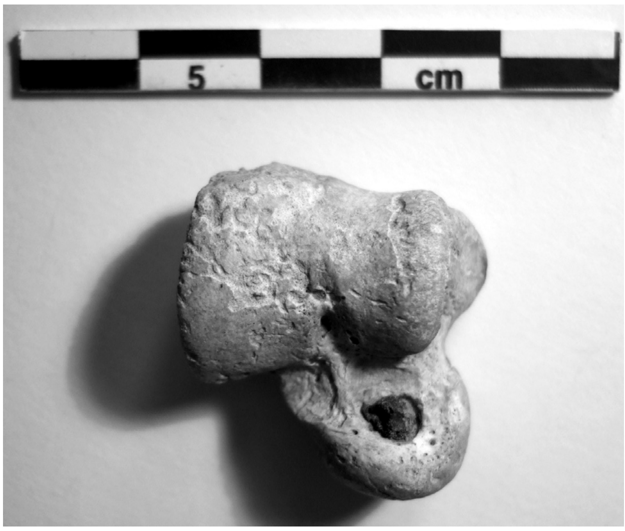

Figure 18.10. Beaver astragalus amulet found in Merovingian woman's grave (sixth-seventh century AD) in France. It is contemporary with Estonian beaver astragalus amulets but the context is totally different. (Courtesy Olivier Putelat).

Beaver astragalus amulets occur with some regularity on sites (Luik 2010) in Estonia and across northeastern Europe into Russia from the Roman Iron Ages onwards. This must be related to the availability and importance of this species in the fur economy. However, examples of such amulets have also been found in two separate Merovingian graves in France (Fig. 18.10) (Putelat 2007). It is unlikely that the early Christian woman in the sixth-seventh century AD French grave attributed the same meaning to the amulet she wore as her contemporaries in pagan Estonia. The presence of the amulet nevertheless likely attests to contacts between the two areas and the recognition of the protective qualities of this special skeletal element. Typically, the amulet was used by a woman since, in this period at least, women and children were seen as being most in need of magical protection.

Hun Period Amulets at Mártély-Szépfű

Another good example of the way amulets were used to protect young children and, at the same time recall family and community histories for the mourners at the funeral comes from an early fifth-century AD child's grave in the south of the Great Hungarian Plain. The dead child was one to one-and-a-half years old at death. The family may have been Huns but the grave goods also show that the parents and family had far-flung contacts and had 'picked-up' amulets from a variety of sources which they put in the grave with the child. The grave goods also present a particularly nice example of the way teeth and bones from the foot were typically used in amulets to represent the entire animal.

The grave was discovered in 1975 eroding out of a hillside rising above the north bank of the Csányi stream, close to where it enters the Tisza River. Contemporaneous Germanic and Avar graves close by show the mixed character of the population living in this area. This single grave was atypically oriented north-south, something more typical of Hunnish burial traditions (Nagy 2005, 99). In addition to the rich bone amulets, there were bronze disk and silver-plate lunela pendants. A beaded bracelet made from shell and an iron bell with copper plating, also placed in the pouch, were put into the right hand of the young child (Nagy 2005, 99). Another bracelet with eye beads also had a brick-shaped bone bead (Fig. 18.11).

The child had also been given a red deer canine pendant on a string around its neck, a custom well known for contemporary Sarmatian burials in this part of the Barbaricum. A horse navicular (hind foot) bone from the foot with incised circle and dot decoration, two left boar tusks with attachment holes at the root end, and a perforated canid fourth metatarsal were also placed in the pouch. Another left boar canine with attachment holes near the open root end, the largest of the three, had been placed under the small child. Small beads, possibly attached to a bone buckle of a type that is sometimes found in the graves of Sarmatian women, were most probably also in the pouch. Finally, a caprine radius from a sub-adult individual appears to have been made on the occasion of the burial and placed next to the right leg. Parallels to this specimen were found in sixth-seventh century AD kurgan graves along the middle Volga River in women and children's graves (Nagy 2005, 103).

The bone objects and skeletal element amulets in this grave are characteristic of different regions:

- Brick-shaped bone bead – typically a Sarmatian type
- Red deer canine pendant – typical for this period in eastern Hungary (one Sarmatian grave near Jaszbereny contained 80 red deer canine beads) in Sarmatian, Germanic, Gepid and late Goth contexts
- Bone buckle – a form typical for metal buckles from the beginning of the fifth century AD
- Horse navicular bone – no parallels from region but mention is made of a horse navicular amulet from a fourth-fifth-century mounted warrior's grave from western Siberia (Nagy 2005, 103) while navicular bone amulets occur regularly in women's and childrens'graves of the fourth–fifth century AD Saltovó-Majak culture along with dog and 'wolf' canines and 'wolf' astragali (The wolf is in quotes because of the somewhat dubious identification) (Balint 1975, 63).
- Drilled fourth metatarsal from large dog or wolf – a typical Avar period amulet
- Three left perforated boar tusks – boar tusk amulets were rarely used locally on the Great Hungarian Plain, and then only in children's graves from the same period. However, the perforations on the large left tusk found under the child have strong parallels in East Gallia and Gallia Belgica where two wild boar tusks were used to form a half moon ornament on leather helmets. A possible interpretation is that this tusk may have been some kind of a war-trophy given

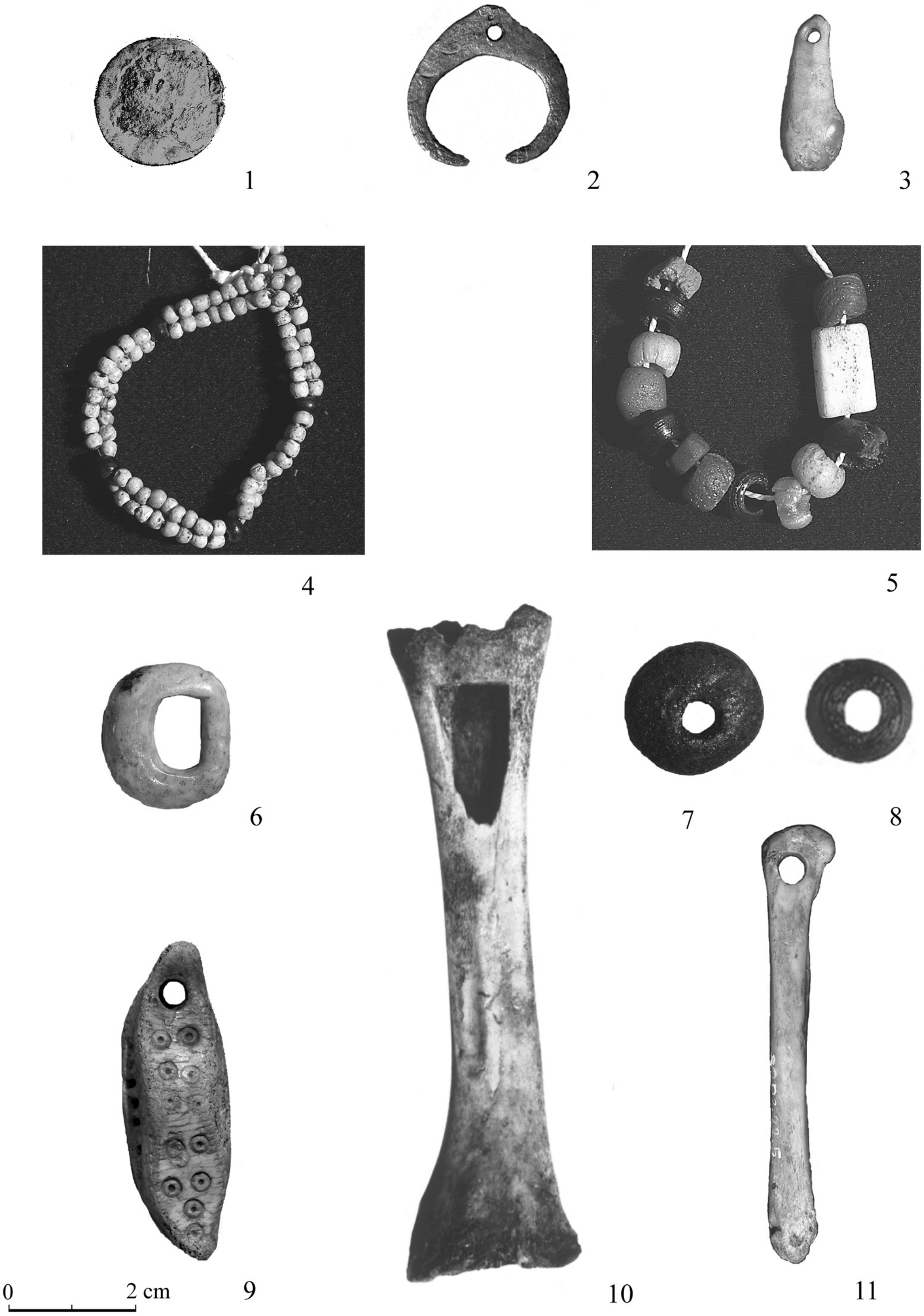

Figure 18.11. Some of the mixed amulets from a 1–1.5-year-old baby's grave at the site of Martély–Szépfű in the south of the Great Hungarian Plain. The grave dates to the Hun period in the early fifth-century AD. 1. Metal disk amulet from neck area 2. Metal lunela pendant amulet around neck area 3. Red deer canine pendant from neck area 4; shell bead bracelet from pouch in right hand 5. Glass-bead bracelet with rectangular bone bead from pouch in right hand. 6. Sarmatian type bone buckle from area of pouch and possibly connected to small bone beaded bracelet 7–8. Large glass beads by left arm 9. Ornamented and perforated horse navicular bone in pouch 10. Worked radius by right leg 11. Perforated dog metatarsus in pouch (Courtesy Margit Nagy, Photograph Gálné, Csilla Tóth).

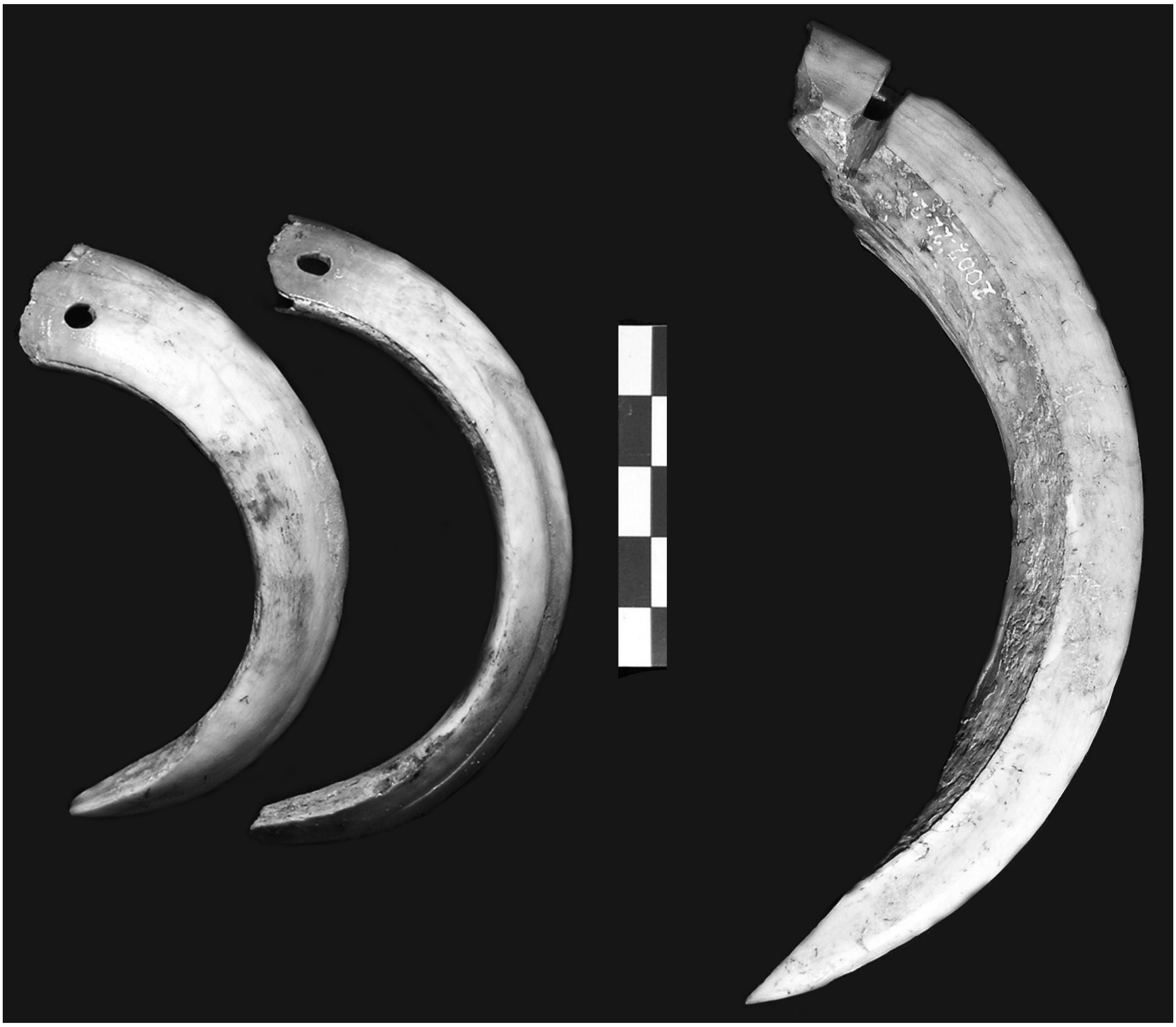

Figure 18.12. Three perforated left-hand wild boar tusks. The two smaller ones on left from pouch and the huge tusk with perforations suggesting it came from a East Gaul helmet as war booty placed under the baby's body. (Courtesy Margit Nagy, Photograph by Gálné, Csilla Tóth).

by a warrior relative to protect the small child (Nagy 2005, 102) (Fig. 18.12).

- Caprine radius – parallel specimens found in sixth-seventh-century AD kurgan graves along the middle Volga River in women and children's graves (Nagy 2005, 103).

All these objects (bell, lunela, beads, disk pendant, red deer canine, navicular bone, buckle, tusks) seem to be amulets which were contributed by the families of the deceased. All but the worked caprine radius were well worn. Bells, with their elaborate Roman technology, are often found with Migration Period symbolic horse burials without the horse itself. The bell was considered apotropaic when worn by living herd animals as well and is a typical Hunnish element (Nagy 2005, 103–4).

The amulets are generally typical of the region and the period (beginning of the fifth century AD) with the exception of the large tusk, which may have been formerly attached to an enemy's leather helmet. The Huns repeatedly conducted raids in East Gallia. Giving a child such a fierce token reflected both a desire to protect it in the afterlife but, at the same time, proclaimed the warrior status of the child's family during the burial process. That the child was given such a wealth of magical protective objects is not surprising although children's graves in the early fifth century AD in the surrounding region may also be totally devoid of any grave goods. For this reason it is striking that there is textual evidence that children under three years of age in the Turkic-Mongol tradition were given rich burial goods in this period. These written sources suggest that the life-force of such babies were held by the Mongol goddess Umaj until the age of three at which time they become independent entities (Nagy 2005, 105). Until that time they were in particular need of magical protection.

Conclusions

The examples of animal transformation presented above represent a minuscule portion of the many ways humans around the world transformed and materialized the biological animals surrounding them into a multitude of cultural constructs. For example, as Szyniewicz (1990, 84) says about the Mongol pastoralists he studied, "Man is related to his ancestors by descent and symbolically by the concept of 'bone'. There is also a relationship between man and sheep, both real and symbolic. The sheep's tibia bone is a material sign of the conceptual bone that symbolizes human descent, and both are linked with the mythological ancestors." Of course, the specific bones and stories must certainly have varied greatly in different times and different places. However, the process of differentiating and manipulating animal body parts seems to be a human universal, either in meat taboos, feasting, or in amulets or as bones of power on their own. These body parts, usually from the head or foot region, are often associated with the defense and feeding habits of the animal on the one hand and the movement of animals on the other. With culturally idiosyncratic attributes of the whole animal in mind, they also stand for the way people think about their own social interactions. Imposed on the animals themselves, the conflation of human and animal can be directly incorporated into various mythologies traditionally recounted over hundreds of years.

These ideas and stories about animals were borrowed, re-interpreted and naturally evolved over space and time. One example of changing meaning over time and space is associated with the beliefs surrounding the humble rabbit's foot over the past 1500 years or so.

Another way notions of animal were manipulated was through imitation. In some cases, the idea behind particular amulets was reinforced by changing the typical raw material used in its manufacture to bone, perhaps from very particular animals, procured under special circumstances and associated with culturally constructed qualities. Examples here include Chalcolithic projectile points, normally produced in metal but appearing in bone on some sites in Hungary, probably kept in pouches based on the wear and buried deliberately in settlement pits. Other types of imitations of actual skeletal element forms also appear in raw materials such as bone or bronze. There are copies of red deer canines perforated and found in Late Neolithic and Middle Chalcolithic burial or sacrificial contexts in Hungary. In later periods astragali were copied as well. In the latter case, the choice of different raw materials was not related to lack of availability of the actual skeletal elements but rather a desire to amplify the message by producing them in special raw materials such as robust aurochs bone or bronze.

Fragmentation of bone objects or pieces of bone in ritual contexts related to social enchainment seems to be less common for bone finds than other classes of objects. Special objects made from osseous raw materials tend to be found whole, or at least broken but not divided. There is, however, the example of an object from the late Middle Bronze Age levels of Százhallombátta–Földvár in Hungary, which appears to be a deliberately fragmented object. This is piece of a bone had been handled over a long period, perhaps kept in a pouch, given its color and the nature of the polish over its entire surface. It appears to have been deliberately removed from circulation in a manner reminiscent of what happened to the dangerous and powerful contents of African witchdoctor sets that are generally buried away from habitations (Plug personal communication 2008) as powerful objects that pose a danger to ordinary people.

Ethnographic analogy and social anthropology provide one source of indirect models that may help specialists recognize and carefully interpret relevant patterning in archaeozoological assemblages. Some animal remains possess a clear potential for illuminating intrinsic aspects of the cognitive connections between humans and animals through recognition of patterning in the spatial distribution and special treatment of animal bone, including manufacturing of skeletal elements found in distinguished contexts on archaeological sites.

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19. Skeletal Manipulations of Dogs at the Bronze Age Site of Százhalombatta-Földvár in Hungary

Maria Vretemark and Sabine Sten

Excavations on the Middle Bronze Age fortified site of Százhalombatta-Földvár in Hungary have been carried out for the last ten years. The site is situated on the eastern side of the Danube, about 30 km south of Budapest in Hungary. A large, well-preserved animal bone assemblage was collected from this tell site. About 3.5 % of the identified bone fragments from domestic species consist of dog remains. A total of 1175 fragments of dog bones have been studied so far. The dog bones represent a rich source of information about the use of dogs and the symbolic relationship between humans and dogs. The dog fragments include anatomical elements from all sections of the body. The age structure of the dogs shows a predominance of adult animals. The dog bones display several cut marks, similar to butchering marks. The cut marks are interpreted as signs of cynophagy (consumption of dog meat) on this site. The importance of dogs is also seen in the use of dog bones and teeth as pendants.

Keywords: Dog bones, Bronze Age, Hungary, cut marks, pendants

Introduction

The Middle Bronze Age fortified site, a so-called tell, of Százhalombatta-Földvár lies on a plateau, on the eastern side of the Danube, about 30 km south of Budapest, Hungary. An international collaborative research project between Hungary, Sweden, England and America has been carried out on this site since 1999. Excavations at this tell site have revealed a large, well-preserved bone assemblage (Vretemark and Sten 2005; 2008). The number of bone fragments from dogs in this faunal material is striking, particularly among the animal remains from the Middle Bronze Age Vatya culture layers, dating to about 2100–1600 BC.

About 3.5% of the identified bone fragments from domestic species consist of dog remains. To date, a total of 1175 fragments of dog bones have been studied. The dog bones are a rich source of information about the use of dogs and the symbolic relationship between humans and dogs. The dog fragments include anatomical elements from all body parts. Apart from bone fragments, the presence of dogs is also clearly indicated by numerous gnaw marks on different animal bones in the household refuse and by their coprolites.

The age structure of the dogs shows a predominance of fully grown animals. About 80% were adult individuals. Several examples of jaws with heavy wear as well as obvious pathological conditions in joint sections and vertebral spines indicate that many of the dogs were kept until they were very old.

Dogs for herding, guarding and hunting

There was a predominance of medium-sized slender dogs, about 50–55 cm in wither height (Vretemark and Sten 2008). It is, however, clear that there were dogs of different types and sizes; some very large as well as some small ones (Vretemark and Sten 2008). This is a sign of well-developed Bronze Age dog breeding practices, where different types were bred and used for different functions.

The importance of dogs was probably related to their use for animal husbandry; they were presumably used primarily for herding, protection, and guarding the herds, especially sheep. These functions must have been of vital importance in a culture where identity and wealth was based on domestic animal stock and where the productive yield from husbandry was essential for survival. The dependence on dogs in everyday life could explain the custom of using dogs, in particular, as building sacrifices (Ullén 1996). Some dog bones, especially jaws, crania and paws, were found in such contexts (Fig. 19.1). Even a dead dog was regarded as providing protection for houses, people, animals and possessions. It seems probable that this is not a random phenomenon, and it probably reflects ritual treatment of dogs at this particular site. Owning dogs of

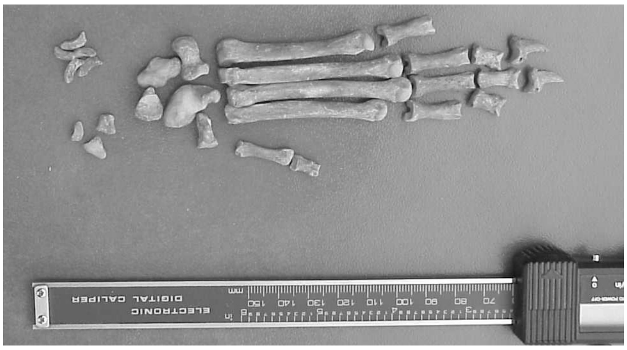

Figure 19.1. Dog paw found in a small pit, close to a house foundation. (Photo by Maria Vretemark).

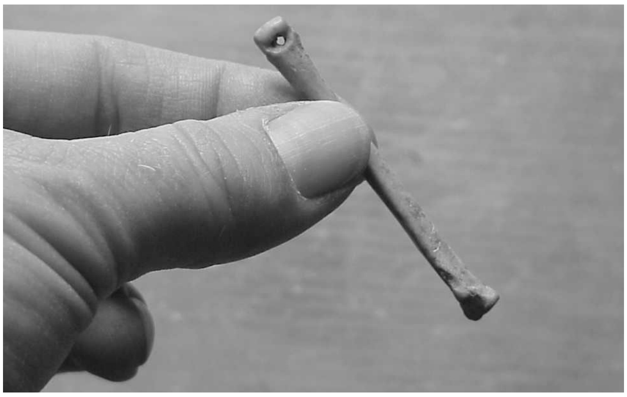

Figure 19.2. Many dog metapodials with drilled holes in the distal joint were found. This is an example of an object from the animal world that was used as an amulet or pendant. (Photo by Sabine Sten).

different types could also be seen as a mark of high social status (Sten and Vretemark 1992).

The dogs were certainly also useful in hunting, but this was not the main reason for keeping dogs. Hunting had negligible importance for meat provision, as only a small number of bones from wild game (about 4%) were found in the kitchen waste of the settlement (Vretemark and Sten 2005). Hunting activities may have satisfied needs other than food, such as antlers, hide and leather, or raw material for bone tools.

Pendants of dog bones and teeth

Dog bones and teeth were also used as pendants. In other words; certain parts of the dead dog's body were transformed into specific objects (Figs. 19.2 and 19.3). Amulets made from drilled teeth and metapodials from dogs can perhaps be seen as an expression of social identity of the inhabitants of the Bronze Age tell settlement, and perhaps within the Vatya culture as a whole (Choyke, Vretemark and Sten 2003). Such objects may, on an unconscious level, be related to conservative traditions passed on within the regions, settlements and households. The pendants do not appear in other cultural contexts in Hungary and could thus be seen as significant for the Vatya cultural sphere.

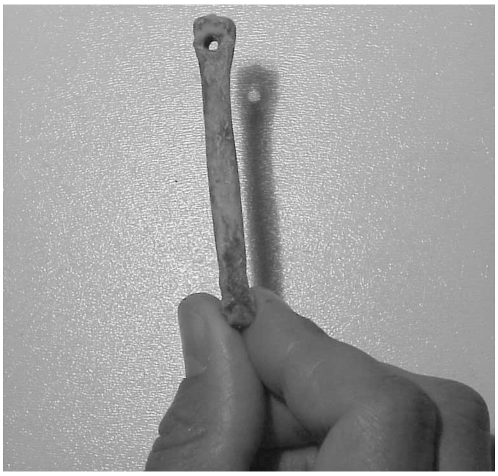

Figure 19.3. Another example of a dog metapodial with a hole drilled through the distal end. (Photo by Sabine Sten).

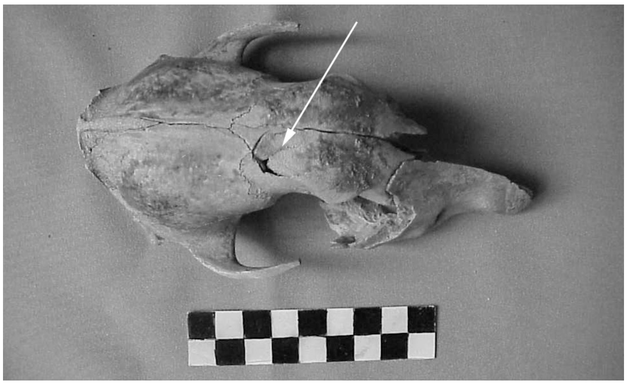

Figure 19.4. The dogs were killed by a blow on the forehead as can be seen on this cranium from a middle sized dog. (Photo by Maria Vretemark).

Drilled metapodials of hare, along with drilled teeth of sheep and horse, are also found in the cultural layers of the Bronze Age site. The amulets of sheep and horse are especially interesting as they reveal a close relationship between humans and domestic animals.

Consumption of dogs

Some dog crania show obvious signs of a hard blow to the frontal bone (Fig. 19.4). The dogs probably were killed this way. About 4% of the dog bones also display several thin cut marks, (Fig. 19.3), similar to butchering marks (Vretemark and Sten 2008). These marks are seen as evidence that cynophagy occurred at the Bronze Age Szahalombatta tell settlement. Both adult and juvenile dogs were eaten based on traces of butchery and supported by the fact that remains of dogs are found in the living areas among kitchen waste (Linseele 2002). The cut marks could, of course, sometimes have been made while getting at specific bones or removing the skin. However, the marks are visible on all sorts of bones, on both the lateral and medial sides of different anatomical elements (Figs.

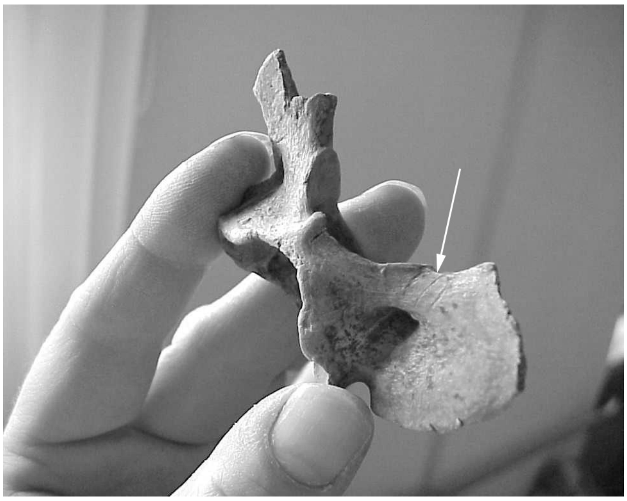

Figure 19.5. The cut marks could be seen on bones from all body parts, such as this example from the atlas. (Photo by Maria Vretemark).

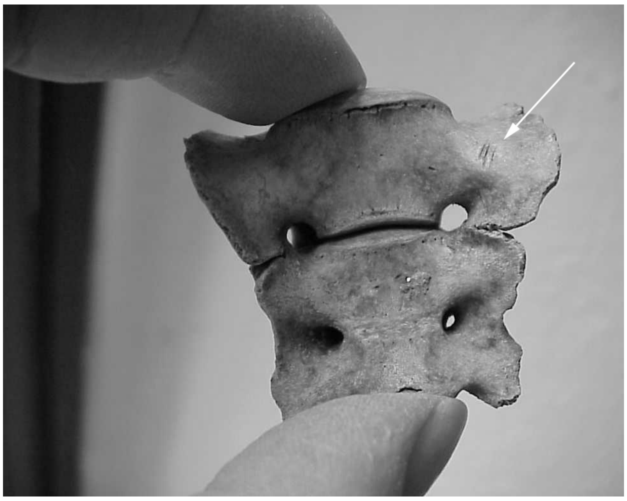

Figure 19.6. Cut marks on a dog sacrm. (Photo by Maria Vretemark).

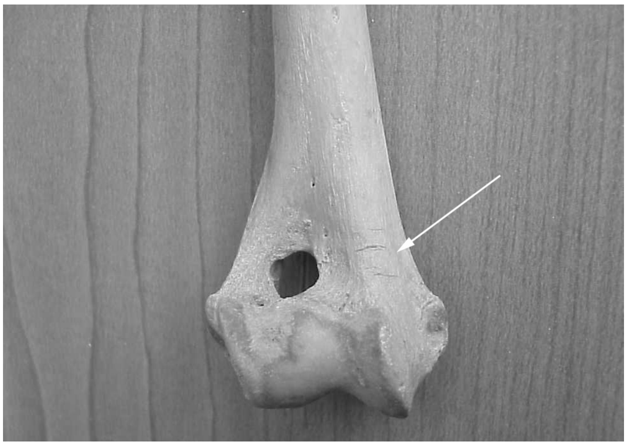

Figure. 19.7. Cut marks on a dog humerus. (Photo by Maria Vretemark).

19.5–19.7). The butchery and disarticulation of the dogs appears patterned. The skulls were crushed presumably to get at the brain.

The dogs had a special place in the society, and in this sense it may seem contradictory that their flesh was eaten. However, dog consumption most probably took place on rare, special occasions. The dog bodies were carefully defleshed to avoid too much damage to the individual bones. This may indicate that dog meat was consumed as a part of a ritual behavior within the settlement, perhaps as a significant part of the cultural or religious rite. On the basis of the arguments presented here it is obvious that the dogs had a special importance in the Hungarian Bronze Age society and were of great importance to the people of this large tell settlement.

Acknowledgements

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Vretemark, M. and Sten, S. (2008). The faunal remains. Emergence of European Communities Archaeological Research Report. *Szazhalombatta Archaeological Expedition. SAX Report 3*. Matrica Muzeum, in press.

20. Bovid Skulls in Southeastern European Neolithic Dwellings: The Case of the Subterranean Circular Room at Promachon-Topolniča in the Strymon Valley, Greece

Katerina Trantalidou

At the Late Neolithic settlement Promachon–Topolniča, 17 modified cattle skulls have been identified among the some 50,000 bones and other material which was found in a special function semisubterranean structure. The cranial cavity of the cattle skull has been removed and only the frontal bone and in some cases the nasal, the temporal, the lacrymal, the zygomatic and the upper part of the maxillary bone remained. Seven bucrania also bear skinning marks on the skull and at the base of the horn cores.

The skull was altered in order to be quite flat in both basal and dorsal views. Bucrania could have been worn as masks covering the face or resting upon the heads of dancers during ceremonies. Since there is no textual evidence from the Neolithic, it is impossible to have direct access to their beliefs or rituals. Clay models of houses have been uncovered at the Promachon–Topolniča, and they show bucrania applied to the walls. It is possible that the archaeologically-recovered bucrania were displayed in this way. The skulls could also have been linked to beliefs that may have existed at other Southeastern European or Anatolian sites. Archaeologists argue that the strength of the real animal (either wild or domesticated) could assure the long survival of a building or a community.

In addition, one red deer antler and two bucrania displays traces of ochre. Among many different cultures, ochre has been associated with blood, births and regeneration, puberty rites, butchering and meals, or battles, and it strengthens the symbolic meaning of those cultural artifacts.

Keywords: Bucrania, biological and cultural features, domesticated and wild cattle, Greece, Southeast Europe

Introduction

The main contributions of archaeozoologists to the debate regarding the role of modified bucrania are the insights we can provide on bone modifications, that is, on the transformation of a biological specimen into a cultural artifact. This paper reports on a collection of bucrania from the Neolithic village of Promachon-Topolniča, on the Greek-Bulgarian border. Here, 17 bucrania were found inside a subterranean building, along with artifacts and unmodified animal bones. This chapter will describe the recently discovered bucrania from Promachon-Topolniča and the role that they might have played in the Neolithic of the Mediterranean.

The bucrania that were selected for modification were chosen without regard to the domestication status, age, or sex of the animal. The crania appear to have been modified as follows: after the head was removed, it was cut up and the mandible was removed. The upper part of the cranium, the frontal bones and the horns, was retained. An example of this can be seen at Hallan Çemi dated between 10,800 and 9800 BP (Rosenberg 1994; Rosenberg 1999).

In most cases, the skulls were plastered with unbaked clay. Examples of this are seen at the well-known site of Çatal Höyük in Anatolia and at the sites of Kormadin near Zagreb and Dikili Tash I on the Aimos peninsula in Macedonia, dated to 5450–5000 BC (Treuil and Darque 1998, with corresponding bibliography).The clay may contain ferrous oxides which can color the bones. This is one of the reasons why the bones appear to be decorated with a red substance.

The bucrania, or sometimes just the horns, are found underneath communal constructions (*e.g.*, tell Halula, tell Herpály, Hódmezővásárhely- Gorzsa), in shafts that appear to be ritual in nature (*e.g.*, Jerf el-Ahmar), attached to walls on the interiors of houses (*e.g.*, Hallan Çemi, Szegvár-Tűzköves), on posts near hearths (Kormadin), and on the exterior facades of houses (*e.g.,* Vinča). Sometimes the crania were incorporated into the construction materials of architectural conplexes, including the basements, the benches, and the walls (*e.g.*, Jerf el Ahmar, Mureybet, tell Abbar III, tell Halula, Çatal Höyök).

Naturalistic crania exist side-by-side with those that have been heavily modified. Their functions within the buildings in which they are found remains unknown. At Çatal Höyök the association of these objects and representations of human and animal figures led the original excavator to interpret some of the buildings as sanctuaries dedicated to a masculine fertility god (Mellaart 1963; Mellaart 1964; Mellaart 1965; Mellaart 1967; Hodder 2005). At Dikili Tash, on the other hand, the excavators think that the bucrania served a purely decorative function, as is the case in many contemporary examples from the interiors of houses or animal enclosures. The presence of the crania embedded in the walls could be interpreted as a preoccupation with the supernatural; the strength of the living animal could protect and safeguard the building. The bucrania found in the basements have been interpreted as foundational deposits, linked to rituals carried out before construction (Treuil and Darque 1998; Molist 2003, 108–9; Cauvin 2004, 37).

The bucrania were covered with clay and ornamented with ochre and incisions. These methods were also used to decorate figurines. Archaeological data show that ochre is used to decorate the bodies of the dead in many cultures from the Paleolithic onward. Ethnographic data indicate that ochre was also used to decorate living bodies during initiation rituals, such as adolescent rites of passage. For many anthropologists, ochre is perceived as living blood, and it is present at all the important events in an individual's life.

Although the faunal materials associated with the bucrania reported here have not been systematically analyzed, these specimens are interesting examples of the transformation of skeletal remains into artifacts that played important symbolic roles in the Neolithic societies of the Eastern Mediterranean.

Archaeological Background

The Neolithic village of Promachon-Topolniča, on the Greek-Bulgarian border covers two adjacent hilltops. It is situated on the southeastern slopes of Mount Cerkine, on a natural pass, on the western bank of the River Strymon. Excavations carried out between 1993 and 2003 within the Greek sector were conducted by Dr. Ch. Koukouli-Chrysanthaki, Dr. I Aslanis, and M. Valla (Κουκούλη-Χρυσανθάκη *et al.* 1995, 561–75; 2002, 87–98; 2003, 75–82; 2005, 90–110).

The site, dated from the end of the 6th millennium BC to the second half of the 5th millennium BC, was an open, settlement of 5 ha. The settlement was occupied continuously for some 500 years, and the chronology has been divided into three phases on the basis of pottery, the absolute dating, and the evolution of the architecture (Koukouli- Chryssanthaki *et al.* 2007, fig. 6). Phase III (ex IV) corresponds to the Early Chalcolithic period (4500–4300 BC). The architectural remains have been totally damaged by plowing. Phase II (5070–4700 BC) had single-storied, timber-framed houses with interior hearths. Roofs were made of woven reeds and branches coated with clay. Large stones reinforced the base of the walls. A 5 × 8 m building in the Bulgarian sector, with three female relief busts found on a bench, has been interpreted as a sanctuary. Phase I (5300–5070 BC) dates from the end of 6th millennium to the beginning of the 5th millennium. We do not have a complete set of absolute dates for the lower levels (Phase I) (Koukouli-Chryssanthaki *et al.* 2007; Vajsov 2007, 82).

Four buildings (plus nine in the Bulgarian sector) with underground rooms have come to light. The semi-subterranean areas were usually small, separated from each other by unexcavated natural soil. These structures were covered or surrounded by ground level rooms made of large wooden piles. The walls of those "super terrestrial" huts were constructed with woven branches daubed with clay.

The most important subterranean structure was uncovered under the remains of a phase II building. It was a roughly circular room, with a diameter of more than 12 m and a depth of more than 7 m. The inner walls, dug into the virgin soil, were covered with a layer of clay. Many earlier floors testified to the continuous use of this area. The floor levels were covered by "thin layers of white material with organic remains and thick layers of a fine sandy soil, which extends from the walls of the pit and sloped downwards towards the centre where they leveled out" (Koukouli- Chrysanthaki *et al.* 2007, 10).

Below those floors, a thick deposit has come to light containing pebbles, stones, a great quantity of pottery (storage, drinking, and ritual vases), marble and clay figurines, tools, jewelry, great quantities of grinding stones, animal bones, and bucrania, all objects testifying to various community activities. A similar deposit was found outside the subterranean room.

However, two clay models of houses have been uncovered at the Promachon and they show bucrania applied to the walls. It is possible that the archaeologically recovered bucrania were displayed in this way or placed on timber posts.

The function of such semi-subterranean structures is unclear. They may have served as dwellings, workshops, or even storage pits although the frequent and repeated presence of bucrania in a specific location can be seen as the principal characteristic of a public building (Chrysanthaki *et al.* 2007, 55).

Faunal remains from the semi-subterranean structure at Promachon

The faunal remains from this structure appear to have been selectively collected by the excavators. The 17 horn cores

Catalog number	METRICAL DATA					Index	Preservation of the horn core	Non-measurable characters
	Basal circufference	Max. diameter	Min. diameter	Length of the outer curve (preserved part)	Length of the inner curve (preserved part)			
IΣT 118							1/5	R, curved outward
IΣT 1166	139.0	46.3	41.7	114.0	97.0	90.6	3/5	R, F
IΣT 1166	220.0	72.7	62.0	–	197.0	85.87	4/5	R, skull; the horn is held horizontally and then downwards, M?
IΣT 1179	174.0	57.7	48.3	170.0	–	83.71	3/5	L, thin walls, horn held horizontally and then downwards, cut marks around the orbit of the skull (pair of horn cores), F ?
IΣT 1207	150.0	50.9	42.2		130.0	82.9	3/5	L, F
IΣT 1335	179.0	60.8	46.0	195.0	130.0	75.66	4/5	R, pair of horn cores held horizontally and then directed downwards, compact and short bone, M
IΣT 966	160.0	45.9	45.1	160.0	133.3	98.26	4/5	R, cut marks on the right frontal, directed downwards, strong grooves, painted with red argillaceous clay, F
IΣT 1141	~214.0	72.4	62.9		135.0	86.86	2/5	It was collected together with a tibia fragment and a thoracic vertebra
IΣT 1145	177.0	60.2	49.7	285.0	212.0	88.96	4/5	L, directed downwards, strong grooves,cut marks on the frontal bone
IΣT 1189	154.0	54.2	44.5	130.0	125.0	82.00	3/5	R, held horizontally and then directed downwards, strong grooves, grey argillaceous clay, F
IΣT 1459	236.0	81.9	64.4	220.0	155.5	78.63	2/5	R, held horizontally
IΣT 1628	215.0	69.6	62.7	200.0	140.0	90.09	3/5	R, green silt on the horn
	151.1	49.8	44.3	212.0	185.0	88.96	4/5	R, held horizontally and then directed downwards, strong grooves,cut marks on the frontal bone, grey argillaceous clay, F
IZ 594	164.0	56.1	42.9		130.0	76.47	3/5	L, covered with green silt (from the deposits?), F
IΣT 1164	180.0	59.3	50.4	228.0	175.0	84.95	4/5	L, light and porous, held horizontally, the frontal bone was found seperately, M
IΣT 1253 (16442)	226.0	76.5	64.2	155.0	148.0	83.92	3/5	R, held horizontally and then directed downwards, M?
IΣT 1257	162.0	57.6	44.1	235.0	186.0	76.56	–	L, held horizontally and then downwards, cut marks on the frontal bone
IΣT 1334	–	–	–	260.0	240.0	–	3/5	L, quite thick and spiral, cut marks near the orbit and on the nasal bone, M
IΣT 1597	164.0	54.4	50.4	178.0	160.0	92.65	3/5	R, held horizontally and then directed downwards, strong grooves, cut marks on the frontal bone, M
–	152.0	50.3	40.1	164.4	150.0	77.36	4/5	R
IZ 583	158.0	54.2	43.4	256.0	200.0	80.07	4/5	L, curved downwards, strong grooves, F
	–	–	–	–	–	–	–	skull fragment and mandible
IΣT 1355	–	–	–	–	–	–	–	L, fragment of a frontal bone, cut marks on the frontal bone
IΣT 1401	160.0	58.6	39.7	–	–	67.75	1/5	L, pair of horns, cut marks on the frontal, at the horn base, F
IΣT 1579	191.1	64.9	54.2	–	–	83.51	2/5	L
IΣT 1596	150.0	54.1	39.0	160.0	–	72.9	3/5	R, pair of horns reconstructed from many pieces, a part of the skull is preserved, F
IΣT 1609	155.0	54.7	39.8	140.0	–	72.76	3/5	horn and frontal bearing green silt
IΣT 1728	–	60.4	–	–	–	–	–	R, a part of the frontal bone is preserved
IB 209 Δ 2390	180.0	61.9	50.4	110.0	–	81.42	3/5	R, F
IB 1002 Δ 138	199.9	64.5	50.5	142.0	110.0	78.29	–	L, M
IΣT 1167	160.0	52.3	44.5	221.0	114.7	85.09	4/5	L, horn core held horizontally and then directed downwards, thin walls, strong grooves, painted with red argillaceous clay, cut marks on the frontal bone, F
IΣT 1167	160.0	52.3	44.5	221.0	114.7	85.09	4/5	L, horn core held horizontally and then directed downwards, thin walls, strong grooves
IΣT 1307	171.0	54.0	46.7	170.0	160.3	86.48	3/5	L, F, horn core directed downwards, pair of horns
IΣT 1569	–	–	–	225.0	177.0	–	4/5	R, pair of horns in many fragments
IΣT 1610	225.0	99.2	79.2	150.0	–	79.84	2/5	wild or transitiomal form
IB 226 Δ1916	–	90.6	–	–	–	–	1/5	L
Δ2389	180.0	60.2	49.8	110.0	110.0	82.72	1/5	R, cut marks on the frontal bone, F ?

Table 20.1. Promachon-Topolniča: Bucrania from subterranean structure.

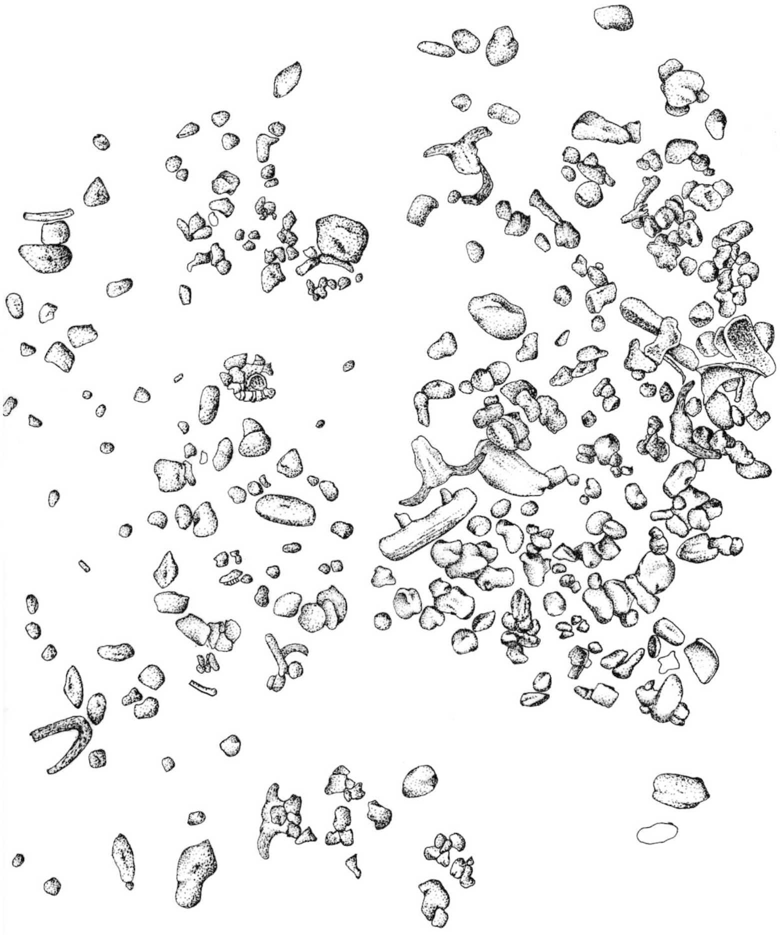

Figure 20.1. Plan of Promachon-Topolniča showing locations of bucrania.

analyzed here out of the 386 collected in the earliest layers, with or without the neurocrania, include a minimum of 11 male and castrated sheep and four goats with scimitar-shaped horns. One very fragmented pair may have come from a male ibex, and another horn core has chop marks at its base. It had been detached from the cranium.

Seven antler tine fragments come from red deer. All 7 come from adult or senile males. All were modified by cutting, chopping, or hack marks and appear to be workshop waste. A total of 35 other bucrania or horn cores were identified (Table 20.1).

A very few other mandibles or long bones were included in the material. They are assigned to the families of Bovidae and Suidae (mainly domesticated), evidence that most (over 95%) of the resources exploited by the Promachon community were domestic animals, especially cattle. In the layers where the bucrania were found, cattle make up 80% of the assemblage in terms of NISP and more in terms of their contribution to the diet. The horn cores do not appear to have been collected for glue-making or horn-working.

In the same sample, 17 of 35 individual cattle skulls represent modified bucrania. The remainder of the horn cores may eventually help us understand the biological variability of these cattle.

At Promachon, the biometrical criteria (Table 20.1) indicate that the horn cores are remains of domesticated cattle, except perhaps for one pair (ΙΣΤ 1610) which has thicker walls and larger diameters than all the other specimens. From the evidence available, 7 of the 35 cattle horn cores could have come from bulls.

The refuse material from the pit contains bones from all age classes. However, the most of the animals fall into two age groups: adults and elderly animals that were at least 6 years old. The porous bone of one specimen suggests that it came from a juvenile/sub-adult male.

At Promachon, most of the horn cores, antlers, and bucrania were deposited near the centre of the pit (only one-third of the pit has been fully excavated). All bovid crania, except one, fell or were deposited with their dorsal surfaces face up (Fig. 20.1).

At Promachon, 7 bucrania have cut and skinning marks on the skull and around the base of the horns (Table 20.1). In all 17 bucrania the skull was transformed by these Neolithic people. The cranial cavity was deliberately removed and only the frontal bone and, in some cases, the nasal, the temporal, the lachrymal, the zygomatic, and the upper part of the maxillary bone remained (Figs. 20.2–5).

The skulls had been modified so that they were quite flat

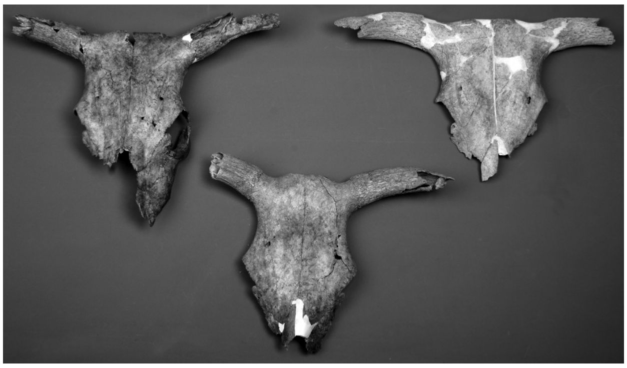

Fig 20.2. Bos *bucrania (ΙΣΤ 1179, ΙΣΤ 1167, ΙΣΤ 1335). Dorsal view (IMG 5467)*

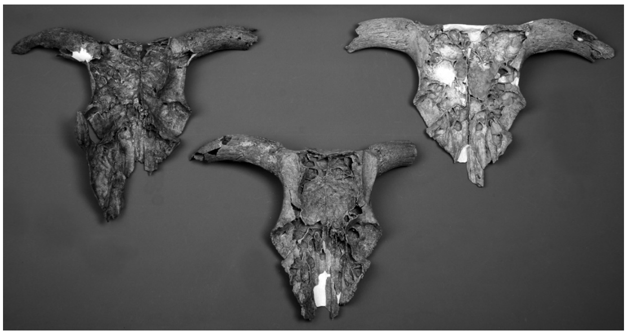

Fig 20.3. Bos *bucrania (ΙΣΤ 1179, ΙΣΤ 1167, ΙΣΤ 1335). Basal view (IMG 5471)*

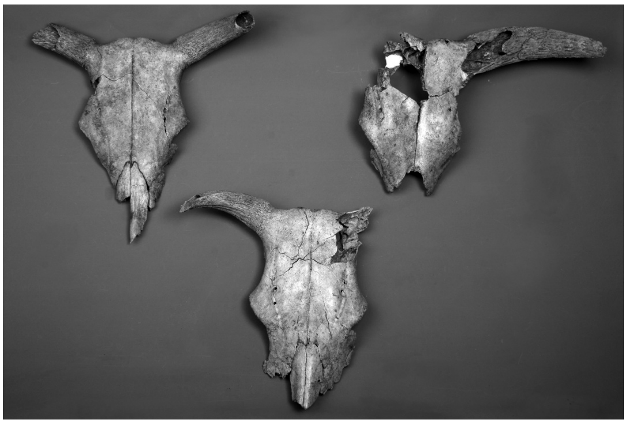

Fig. 20.4. Bos *bucrania (ΙΣΤ 1307, ΙΣΤ 1597, ΙΣΤ 1334). Dorsal view (IMG 5475)*

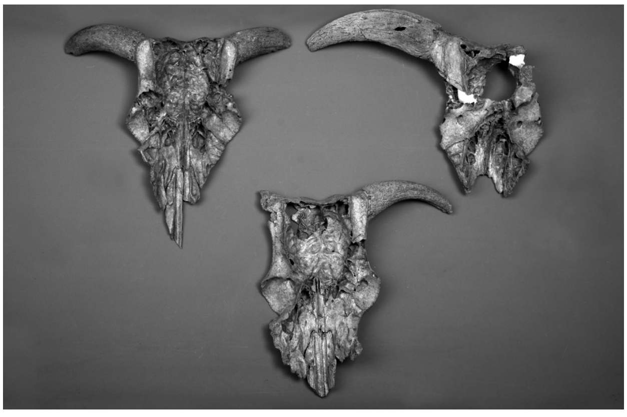

Fig. 20.5. Bos *bucrania (ΙΣΤ 1307, ΙΣΤ 1597, ΙΣΤ 1334). Basal view (IMG 5478)*

on both the basal and dorsal views. They looked like the masks worn vertically, covering the face or resting upon the head of a dancer during ceremonies. Since no textual evidence is available, it is impossible to access beliefs or rituals ceremonies directly or reliably. The crania could also have been applied on the walls or on the timber posts of the structure.

There were two bucrania at Promachon where the horns were painted with either red paint or ochre (the chemical analysis has not yet been completed [determination by XRD]) (Table 20.1). A tiny, red painted antler fragment was discovered at Promachon, attached to a deformed piece of unbaked clay.

Interpretation and conclusions

If we look at a plan of the excavations (Fig. 20.1), it becomes clear that, without exception, cattle skulls were found associated with the rest of the animal bone material. Horn cores and occasional long bones collected with the bucrania reflect the species ratios of the entire assemblage. Thus, the faunal material allows scholars to conclude that cattle were a stable resource for the inhabitants, even if there were fluctuations from level to level between short chronological periods. From 80%, the percentage of cattle bones drops to 45% and 30% respectively in the next phases. However, the large percentage of cattle bones (both in NISP and MNI) in association with the luxury vessels presupposes a larger number of participants at celebrations which took place towards the end of the 6th millennium (Koukouli-Chryssanthaki *et. al.* 2007, 60).

Due to the geomorphology of the Greek peninsula, the percentage of cattle (in terms of NISP) is extremely low, rarely surpassing 25% (Trantalidou 2001, 426–8 with corresponding bibliography). On the Haimos peninsula, the importance of cattle varied from 20% at Opovo, Serbia, where large game animals contributed significantly to the diet, to 90% at Boljevci, Serbia (Russell 1985; Lazić 1988). The proportion of cattle at Promachon exceeds the proportion of cattle from other Greek sites. The small Late Neolithic sample of 2502 bones investigated to date from the Bulgarian sector shows that domestic mammals represent 85.9% of the total assemblage, while wild animals (red deer, roe deer, wild swine, aurochs, hare, wolf, red fox, brown bear, fish, birds and reptiles) comprise 13.8%. Cattle constitute almost half the material by NISP (Iliev and Spassov 2007). At Promachon, the landscape on the whole was suited for raising cattle. Presumably, there was arable land to provide winter fodder. This was the form of subsistence economy that the Neolithic inhabitants chose for their village.

There is little doubt that the majority of horn cores/bucrania came from domestic cattle. One pair, however, suggests the presence of aurochs or of a transitional form. DNA analysis should eventually help determine whether domestic cattle had a single or multiple origins, especially now that many scholars now believe that southern European aurochs contributed to the formation of domesticated taurine cattle (Carameli 2006). At Promachon, based on recent research, small (brachyceros type) and large *primigenius* cattle as well as possible cross-breeds between them may have existed in an approximate ratio of: 8% to 69% to 23% (Iliev and Spassov 2007; personal observation). The height at the acromion varies between 109.9 to 147.7 cm, suggesting there may have been controlled cross-breeding between the wild and domestic forms (Iliev and Spassov 2007, figs. 2, 3; personal observation on some thousands of bones). The horn cores at Promachon seem to derive from the longhorn variant of domestic cattle. Younger and adult animals could have been used primarily for food purposes; the older group may have been kept for their draught power in agricultural work.

Given the some 50,000 to 70,000 bones often collected from excavations, the horns brought to light in the lowest layers of the subterranean structure did not represent a special raw material for tool production in workshops (Armitage 1989; Bartosiewicz 1997), nor were they used as grave offerings.

These frontal bones and horn cores do not represent the remains of some kind of special raw material for tool production in workshops. Nor were they the remains of food refuse or food storage since the bovid crania were modified. After killing and butchering the animal, the skin was removed. The skull was also cleaned of flesh and brain. The fossa incisivus, the maxillary bone up to the facial tubercle, the parietal, the occipital and the mandible were detached from the cranium. Some of the horn cores were painted red. In our opinion, bucrania were placed on walls or on the timber posts in these structures.

Symbolic themes such as the bull occur over a wide area from the Near East into Southeast Europe. According to many authors, the bull reflected a male entity in fertility rites, and the sacredness of the bull is expressed in particular through the emphasis on horns (Gimbutas 1991). The universal idea that aurochs is a beast of great strength and, at the same time, the incarnation of nature's rebirth, may perhaps have been reflected in the ideology of many Neolithic groups. The use of cattle bones inside structures, under floors, or on walls may, in the minds of the Neolithic people, have strengthened the power and longevity of the building (Cauvin 2004, 25–148; Molist 2003; Treuil and Darque 1998).

The situation at Promachon is very ambiguous. It is possible that the large subterranean construction was roofed, leaving (creating) a large central opening. The bucrania could have been suspended on posts around the periphery. Until the rest of the archaeological material is studied and published, I would be cautious about suggesting a religious function for this structure (Vajsov 2007, 81) but I cannot exclude the preparation and the consumption of meals for many persons commemorating events in that special area, a behavior also attested elsewhere (Papa *et al.*), in the same period.

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Dr. Ch. Koukouli-Chrysanthaki (Director of the 18th Ephorate of Prehistoric and Historic Antiquities) and Dr. I. Aslanis (National Research Foundation), the excavators, offered the material to us. The project to conserve the bucrania was financed by the INSTAP foundation. The conservators P. Tzanetakis, P. Gkioni and M. Dalla have all done remarkable work. The photos were taken by Th. Papadopoulos. The chemical analysis was carried out by Dr. S. Sotiropoulou, "Ormylia" Foundation, Art Diagnosis Centre. Our aim, in collaboration with the local authorities has been to develop an exhibition of this material. I am indebted to them all. Special thanks to the editors and reviewers of this volume and to the organizing committee of the Congress and the session.

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21. Symbolism of Sharks for Fisher-Gatherer Groups from the Sao Paulo Coast, Brazil

Manoel M. B. Gonzalez

*Today, many people see sharks as killers, but in the past they were admired by coastal societies that exploited this marine animal for subsistence. Funeral offerings from the shell mounds have been studied on the Sao Paulo coast, and there is an apparent association between materials or abstract shark images used as ritualistic symbols. The main shark faunal remains identified in the offerings are teeth and vertebrae of the white shark (*Carcharodon carcharias*), tiger shark (*Galeocerdo cuvier*), bull shark (*Carcharhinus leucas*) and sand tiger shark (*Carcharias taurus*). Sharks may be considered sacred fishes due to their behavior and the elements that were used as protective adornments or talismans in prehistoric society. The association between elasmobranchs and young men and women (mainly 20 and 30 years old) seems to be linked to fertility, as seen in records from Mexico and Panama. The teeth and vertebrae present in most of the burials also reflect status differences among individuals in the society. Sharks and rays, like other animals, were considered gods in all the Pacific islands and only lost their status after the introduction and establishment of Christianity during the colonial periods in these lands. Christian domination eventually occurred in most coastal groups around the world, causing changes in the culture and beliefs of the people. Thus, sharks ceased to be the gods of prehistoric society and became demonized in current society.*

Keywords: Elasmobranchs, symbolism, shell mounds, hunter-gatherers, Brazil

Introduction

The use of elasmobranch (shark and ray) products can be traced back to hunter-gatherer times in many parts of the world (Kelly 1995; Renfrew and Bahn 2000). Evidence that such groups inhabited the Brazilian coast comes from the studies carried out on five shell mounds in the Baixada Santista region (Duarte 1968; Uchôa and Garcia 1971; Guidon 1964; Figuti 1993; Gonzalez and Amenomori 2003; Gonzalez 2005a).

In addition to the manufacture and use of worked shark and ray skeletal elements, there was a ritual and religious relationship between this group of fish and humans. This is demonstrated by the association of teeth, vertebrae, and spines (stingers) with human burials (Bohering 1961; Silva, 2001; Cione and Bonomo 2003; Gonzalez 2005b). Today, sharks are seen by most people as terrible killers, but people who live or lived near the sea and were aware of the true nature of its inhabitants have a very different view of sharks (Montgomery 2004). The main purpose of this paper is the analysis and identification of the sharks and rays in offerings and their symbolic meaning to the fisher-gatherers groups who lived on the coast of Sao Paulo State in Brazil.

Sharks have retained their special status for inhabitants of the Pacific and Indian Oceans who live mainly on islands and in fisher-gatherer groups. Many of the symbolic features of sharks are related to their supernatural powers to protect fisheries. In past times, sharks were also connected with human sacrifice in some of these cultures. Several tribes consider sharks their ancestors. These animals are very important in the culture and folklore of people from Melanesia, western Africa, Australia and the Amazon Basin as well, a region close to our research area. Faunal remains of great sharks and rays have been found in large Aztec temples in Central Mexico in association with crocodile bones and human burials, often as representations of great sea monsters depicting mythological gods (Compagno *et al.* 2005). Cartilaginous fishes are represented within the material culture of ancient societies as symbolically important species (*e.g.*, Carcharodon carcharias, the white shark). Much of this ethnozoological knowledge is still retained in small-scale tropical societies (Gonzalez and Amenomori 2003; McDavitt 2004).

Methodology

This study was based on the analysis of 15,447 faunal remains from elasmobranch fish (teeth, spines and vertebrae)

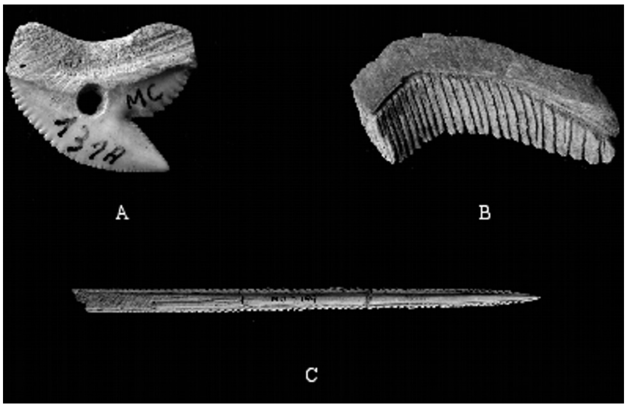

Figure 21.1. Examples of elasmobranch remains: tiger shark, Galeocerdo cuvier, tooth (A), spotted eagle ray, Aetobatus narinari, tooth (B), stingray spine (C).

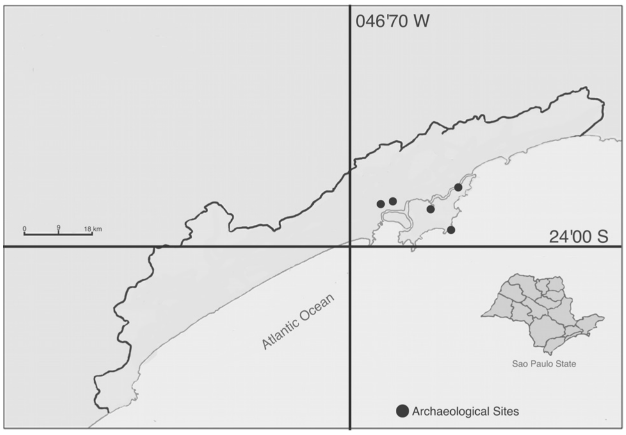

Figure 21.2. Location of shell mounds on the Coast of São Paulo.

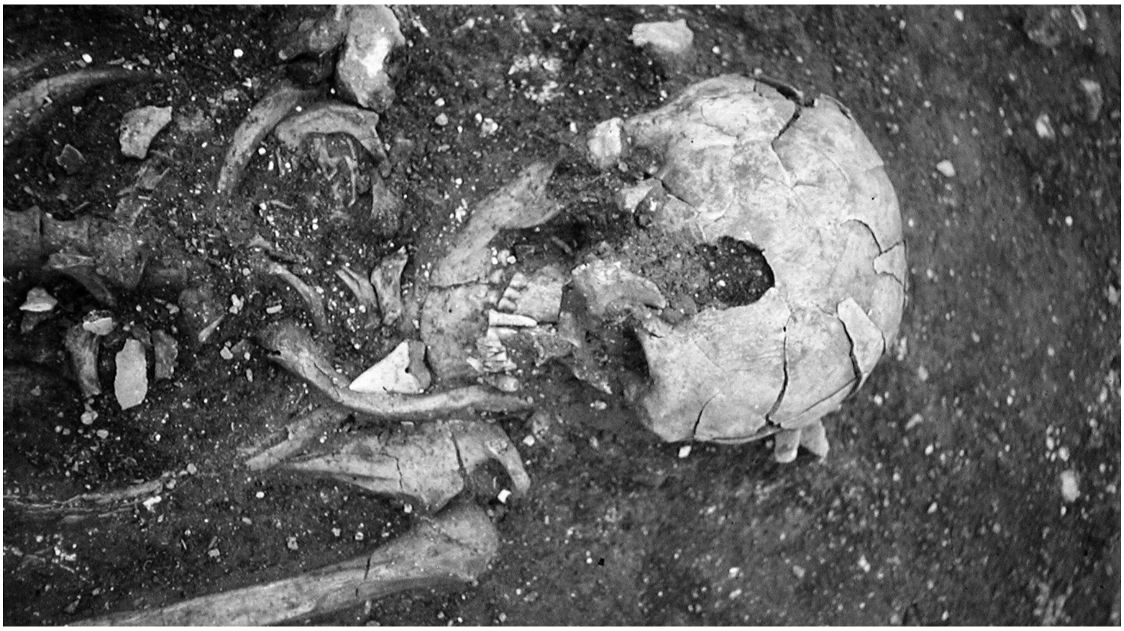

Figure 21.3. Burial XXVII (Piaçaguera Shell Mound), with a tooth of the great white shark, Carcharodon carcharias. (Photo: Documentation of the Museu de Arqueologia e Etnologia).

Site	Years B.P.	Source
Buracão	1950 ± 100	Schmitz *et al*., 1980
Cosipas	4300 ± 180	Schmitz *et al*., 1980
Mar Casado	4400 ± 130	Schmitz *et al*., 1980
Mar Virado	2570 ± 70	Nishida, 2001
Maratuá	3865 ± 95	Schmitz *et al*., 1980
Piaçaguera	4930 ± 110	Schmitz *et al*., 1980
Tenório	1875 ± 90	Schmitz *et al*., 1980

Table 21.1. Radiocarbon dates for shell mounds on the coast of São Paulo.

(Fig. 21.1) in existing collections from archaeological sites on the coast of Sao Paulo (Fig. 21.2) Data from the following sites were examined: Maratuá shell mound, Mar Casado shell mound, Buracão shell mound, Piaçaguera shell mound, Cosipa shell mound, and the sites of Mar Casado and Tenório (Table 21.1). The collections are housed in the Museu de Arqueologia e Etnologia da Universidade de São Paulo (MAE-USP).

Altogether 1333 artifacts (1033 shark teeth and 300 ray spines) were studied. Sixty-three percent (n=840) of these artifacts were collected outside mortuary contexts, and 37% (n=493) were deposited in the burials (Fig. 21.3). The teeth and vertebrae of sharks and rays and ray spines were collected from under and around human skeletons, together with teeth and vertebrae of other animals, often as parts of necklaces. The age and sex of the deceased in the burials was considered in relation to the species of sharks, rays, and other animals found together with them in these graves.

Results

Buracão Shell Mound

There were 43 human burials in the Buracão Shell Mound (Pallestrini 1964). Nine burials were not studied because

Burial	Sex	Age	Species	Skeletal Element	Manufacturing
Burial V	?	Children	Carcharhinus sp. Feline	6 teeth 1 canine	2 drilled, 4 not drilled
Burial XII	Male	Adult	Sand tiger shark *Carcharias taurus*	3 teeth	None
Burial XIX	Male	Adult	Great white shark *Carcharias carcharias* Fish	3 teeth 3 bones	none 3 tools
Burial XXI	Female	Adult	Bull shark *Carcharias leucus* Fish rodents	22 teeth 26 bones 2 mandibles	None None None
Burial XXVII	?	?	Sand tiger shark *Charcharias taurus*	3 teeth	
Burial XXIX	?	Children	Bull Shark *Carcharhinus leucas*	1 tooth	None
Burial XXX	?	?	Bull Shark *Carcharhinus leucas* Blue Shark *Prionace glauca* Mammals *Pecten* shells	1 tooth 1 tooth 1 bone 20 conch shells	None None Worked None
Burial XXXIII	Male	Adult	Sand tiger shark *Charcharias Taurus* Bull Shark *Carcharhinus leucas* Shells Fish	6 teeth 8 teeth 2 conch shells 1 bone	Drilled Drilled Drilled Tool
Burial XXXIV	Male	Adult	Carcharhinus sp. Bull Shark *Carcharhinus leucas*	3 teeth 5 teeth	None None
Burial XXXVI	?	Children	Bull Shark *Carcharhinus leucas*	5 teeth	None
Burials XXXIX and XL	?	?	Bull Shark *Carcharhinus leucas*	2 teeth	None
Burial XLI	?	Children	Bull Shark *Carcharhinus leucas*	18 teeth	None

Table 21.2. The burials with remains of sharks and rays at Buracão Shell Mound.

they were in poor condition at the time of their exhumation. Of the 27 remaining burials, 15 (55.6%) included the remains of sharks and rays deposited as grave goods. Only the burials containing faunal remains of sharks and rays (Table 21.2) will be described.

Of the 15 burials associated with elasmobranch species, two (13.3%) were of children; for 13 (86.7%) the age of the deceased could not be determined, making it difficult to see clear associations by sex and age.

The most common elasmobranch species associated with these burials were *Carcharhinus leucas* (53.3%), *Carcharias taurus* (26.6%), *Carcharhinus* sp. (13.3%) and *Carcharodon carcharias* and *Prionace glauca* (6.7%).

Piaçaguera Shell Mound

Altogether 56 burials were found during excavations at Piaçaguera Shell Mound. Of these burials, only 36 had grave goods, and, of them, 28 (77.8%) contained faunal remains from elasmobranch species associated with teeth of mammals (Garcia and Uchôa, 1980). Only the burials that contained faunal remains of sharks and rays are described (Table 21.3).

Of the burials that contained elasmobranch species, 12 (42.8%) were children, nine (32.1%) were men, and six (21.4%) were women. The sex and age of one individual (3.7%) could not be determined. Four percent of the adults died between the ages of 20 and 30 years, 33.3% died between the ages of 30 and 40 years, and 26.7% died between the ages of 40 and 50 years.

Elasmobranch species appear on their own in 43.9% of the burials; mammal teeth associated with elasmobranch species are found in 39.3% of the burials; while *Olivella* shells are found in assoication with elasmobranch species in 17.9% of the burials. Fish are associated with sharks and rays in 10.7% of the burials, and reptile teeth are associated with these species in 3.6% of the burials. The most common elasmobranch species associated with these burials were *Carcharhinus leucas* (57.1% of the total), *Carcharias taurus* (26.6%), and *Galeoerdo cuvier* (39.3%), as well as *Carcharodon carcharias* (21.4%) and *Sphyrna tiburo* (3.6%).

Mar Virado Site

This section describes material from excavations that took place between 1990 and 1999. Altogether, 22 burials were studied during these years. Of those burials, 14 (63.6%) contained the remains of sharks and rays (Silva 2001). Only those burials that contained the remains of sharks and related rays are described here (Table 21.4).

Altogether 38.9% of burials with elasmobranch species were male; 27.7% were female, 5.6% were children; and the sex of 27.8% could not be determined. Adults buried with elasmobranch species include 55.6% who died between the ages 20 and 30 years, 22.2% between the ages of 30 and 40 years, and 22.2% aged between 40 and 50 years.

Elasmobranch species only occur in 14.3% of the burials. Chelonian remains associated with elasmobranch species occur in 57.1 % of those burials. Fish are found in 50 %

Burial	Sex	Age	Species	Skeletal Element	Manufacturing
Burial I	Female	21 to 25 years	Bull shark, *Carcharhinus leucas*	10 teeth	Drilled
			Bull shark, *Carcharhinus leucas*	76 teeth	None
			Mammals	6 teeth	Worked
Burial V	Male	31 to 40 years	Bull shark, *Carcharhinus leucas*	2 teeth	Drilled
Burial VI	Female	31 to 40 years	Bull shark, *Carcharhinus leucas*	3 teeth	Drilled
			Mammals	1 bone	Worked
Burial VIII	Male	31 to 40 years	Bull shark, *Carcharhinus leucas*	4 teeth	Drilled
			Mammal	1 bone	Fragmented
Burial XIX	Female	21 to 30 years	Bull shark, *Carcharhinus leucas*	4 teeth	Drilled
			Mammal	1 bone	Tool
Burial XX	Children	2 to 5 years	Bull shark, *Carcharhinus leucas*	2 teeth	Drilled
Burial XXIII	Female	21 to 30 years	Tiger shark, *Galeocerdo cuvier*	4 teeth	Drilled
			Mammal	1 tooth	Drilled
Burial XXIV	Male	26 to 35 years	Bull shark, *Carcharhinus leucas*	1 tooth	Drilled
			Fish	1 bone	Tool
Burial XXVI	Male	36 to 40 years	Great White Shark, *Carcharodon carcharias*	3 teeth	Drilled
				23 teeth	None
Burial XXVII	Children	10 to 15 years	Great white shark, *Carcharodon carcharias*	1 tooth	Drilled
			Mammal	135 teeth	Drilled
Burial XXVIII	Male	41 to 50 years	Bull shark, *Carcharhinus leucas*	1 tooth	Drilled
			Tiger shark, *Galeocerdo cuvier*	2 teeth	Drilled
			Mammal	1 tooth	Drilled
Burial XXIX	Children	± 1 year	Great white shark, *Carcharodon carcharias*	1 tooth	Drilled
Burial XXX	Children	1 to 2 years	Bull shark, *Carcharhinus leucas*	5 teeth	Drilled
			Mammal	38 teeth	Drilled
			Reptile	6 teeth	Drilled
			Fish	1 bone	Tool
Burial XXXIII	Children	± 1 year	Tiger shark, *Galeocerdo cuvier*	3 teeth	None
			Tiger shark, *Galeocerdo cuvier*	1 tooth	Drilled
			Olivella verreauxi	23 shells	Drilled
Burial XXXV	Children	2 to 5 years	Tiger shark, *Galeocerdo cuvier*	4 teeth	Drilled
			Bull shark, *Carcharhinus leucas*	10 teeth	None
			Olivella verreauxi	16 shells	Drilled
Burial XXXVI	Female	41 to 45 years	Tiger shark, *Galeocerdo cuvier*	42 teeth	None
				1 tooth	Drilled
Burial XXXVIII	Male	21 to 30 years	Great white shark, *Carcharodon carcharias*	1 tooth	Drilled
Burial XL	Children	1 to 2 years	Tiger shark, *Galeocerdo cuvier*	41 teeth	None
				3 tooth	Drilled
Burial XLII	Children	2 to 5 years	Great white shark, *Carcharodon carcharias*	2 teeth	Drilled
			Tiger shark, *Galeocerdo cuvier*	62 teeth	None
			Tiger shark, *Galeocerdo cuvier*	23vertebrae	None
			Olivella verraeuxi	657 shells	Drilled
Burial XLIII	Children	2 to 5 years	Bull shark, *Carcharhinus leucas*	3 teeth	Drilled
Burial XLIV	Male	26 to 30 years	Bull shark, *Carcharhinus leucas*	109 teeth	None
			Bull shark, *Carcharhinus leucas*	5 teeth	Worked
			Bull shark, *Carcharhinus leucas*	1 tooth	Drilled
			Mammal	2 teeth	Drilled
Burial XLV	Children	± 6 months	Tiger shark, *Galeocerdo cuvier*	2 teeth	Drilled
Burial XLVI	Male	31 to 40 years	Bull shark, *Carcharhinus leucas*	4 teeth	Drilled
			Tiger shark, *Galeocerdo cuvier*	3 teeth	Drilled
			Hammerhead shark, *Sphyrna tiburo*	2 teeth	Drilled
Burial XLVII	Children	± 1 year	Bull shark, *Carcharhinus leucas*	38 teeth	None
			Bull shark, *Carcharhinus leucas*	2 teeth	Worked
			Fish	1 bone	Fragment
Burial XLVIII	Male	41 to 50 years	Tiger shark, *Galeocerdo cuvier*	1 tooth	Drilled
			Olivella verreauxi	9 shells	Drilled
			Mammal	1 tooth	Worked
Burial L	?	Adult	Great white shark, *Carcharodon carcharias*	1 tooth	Drilled
Burial LI	Children	1 to 2 years	Bull shark, *Carcharhinus leucas*	41 teeth	None
				1 tooth	Worked
Burial LIII	Female	26 to 30 years	Bull shark, *Carcharhinus leucas*	95 teeth	None
			Tiger shark, *Galeocerdo cuvier*	2 teeth	Drilled

Table 21.3. The burials with remains of sharks and rays at Piaçaguera Shell Mound.

of the burials with elasmobranch species, while cetaceans, shellfish, and terrestrial mammal remains occur in 21.5% of such burials. The most common elasmobranch (shark) species associated with the burials were *Carcharhinus* sp. (50%), *Carcharhinus leucas* (28.6%), and *Carcharodon carcharias* (21.4%) of the total elasmobranch (shark) species.

Tenório Site

A total of 28 burials were studied from the excavations at the Tenório Site. They include three children, 13 adults and a senior (Uchôa, 1973; Silva, 2001).The remains of sharks and rays were found in seven (25%) of the burials. Only the burials that contained the remains of sharks and rays are described here (Table 21.5).

Burial	Sex	Age	Species	Skeletal Element	Manufacturing
Burial I	Male	18 to 35 years	*Carcharhinus* sp.	5 vertebrae	None
			Turtle	1 shell	None
Burial III	Female	35 to 50 years	Great white shark, *Carcharodon carcharias*	1 tooth	None
Burial IV - Secondary	Female	35 to 50 years 18 to 21 years	Great white shark, *Carcharodon carcharias*	3 teeth	Worked
	Female	6 to 11 years 4 to 5 years	Great white shark, *Carcharodon carcharias*	3 teeth	None
	?	?	Great white shark, *Carcharodon carcharias*	3 vertebrae	Drilled
	?		Fish	1 fin ray	None
			Fish	1 bone	Fragment
	Male		Mammals	43 bones	None
			Turtle	1 shell	None
Burial V	Male	21 to 35 years	*Carcharhinus* sp.	3 vertebrae	None
Burial VI	Male	40 to 50 years	Elasmobranch	2 vertebrae	Drilled
			Sea urchin	20 fragments	None
			Dolphin	1 tooth	None
			Fish	57 vertebrae	None
Burial VIII	?	Children	*Carcharhinus* sp.	15 vertebrae	None
			Dolphin	1 bone	None
			Fish	2 bones	Fragment
			Turtle	1 shell	Fragment
			Spondylus americanus	undetermined conch shells undetermined conch shells	Fragmented
			Cypraea zebra	undetermined conch shells undetermined conch shells	Fragmented
			Acinella sp	undetermined conch shells undetermined conch shells	Fragmented
			Astaea sp	undetermined conch shells undetermined conch shells	Fragmented
			Tegula viridula	undetermined conch shells	Fragmented
			Cokakia sp		Fragmented
			Yearmalocardia sp		Fragmented
			Pictada radiata		Fragmented
			Thais sp		Fragmented
Burial IX	?	Children	*Carcharhinus* sp.	20 vertebrae	None
			Spondylus americanus	undetermined conch shells	Fragmented
Burial XI	Female	25 to 35 years	Bull shark, *Carcharhinus leucas*	50 teeth	None
			Bull shark, *Carcharhinus leucas*	1 tooth	Drilled
			Turtle	1 shell	Fragments
			Dolphin	bones	Fragments
			Fish	1 fin ray bone	None
Burial XIII	Female	25 to 35 years	Bull shark, *Carcharhinus leucas*	2 teeth	None
			Raccoon	1 tooth	None
			Fish	3 bones	Fragments
Burial XIV	Male	40 to 50 years	*Carcharhinus* sp.	9 vertebrae	Drilled
			Fish	10 bones	Tool
			Puffer fish	1 mandible	None
			Turtle	1 shell	Fragments
Burial XV	Male	30 to 35 years	Bull shark, *Carcharhinus leucas*	32 teeth	None
			Turtle	Shells	Fragments
Burial XVII	Male	40 to 50 years	*Carcharhinus* sp.	13 vertebrae	Drilled
			Mammals	2 bones	None
			Turtle	1 shell	Fragments
			Fish	1 bone	None
Burial S/N A	? ?	? 5 to 11 years	Great white shark, *Carcharodon carcharias*	12 teeth	None
			Whale	1 bone	None
			Turtle	1 shell	Fragments
Burial S/N B	?	?	*Carcharhinus* sp.	1 vertebrae	Drilled
	Male	?	Fish	1 bone	Worked

Table 21.4. The burials with remains of sharks and rays at Mar Virado Site.

Elasmobranch species were associated with 57.1% of the female burials, 28.6% of the male burials, and 14.3% of the child burials. The burials with elasmobranch species include adults of the following age ranges: ages 20–30 (50.0%), ages 30–40 (33.3%), and ages 40–50 (16.7%).

Shellfish were associated with elasmobranch species at Tenório in 85.7% of the burials, with mammals in 71.4% of the burials, with fish in 57.1% of the burials, with birds in 42.9% of the burials, with chelonians in 28.6% of the burials, and with hedgehogs in 14.3% of the burials. The frequency of the most common elasmobranch species in the burials were: *Carcharodon carcharias* (14.3%), *Carcharhinus leucas* and *Carcharhinus* sp. (28.6% each), and *Galeocerdo cuvier* and *Pristis sp.* (3.6% each).

Burial	Sex	Age	Species	Skeletal Element	Manufacturing
Burial VI	Female	±18 years	Bull shark, *Carcharhinus leucas*	2 teeth	Slightly modified
			Bull shark, *Carcharhinus leucas*	14 teeth	None
			Mammals	6 teeth	Drilled
			Mammals	22 teeth	None
Burial VII	Female	±40 years	Great white shark, *Carcharodon carcharias*	1 tooth	None
			Mammal	1 tooth	Drilled
			Mammal	1 bone	Fragment
			Shell	1 shell	Drilled
Burial XV	?	Adult	Sawfish, *Pristis*	2 teeth	None
			Tiger shark, *Galeocerdo cuvier*	1 tooth	Some modifications and polishing on the base where it was fixed
			Mammal	1 bone	Fragmented forked tip
			Fish	609 external fin ray bones	475 complete and 134 fragmented
			Fish	447 internal fin ray bones	199 complete and 248 fragmented None
			Mactra alata	1 valve	None
			Capybara	1 tooth fragmented	None
			Raccoon	Half jaw with all the teeth	None
			Bird	4 bones	Fragments
Burial XVIII	Female	±40 years	Great white shark, *Carcharodon carcharias*	3 teeth	Some modifications
			Great white shark, *Carcharodon carcharias*	7 teeth	Drilled
			Carcharhinus sp.	88 teeth	None
			Shell	1 shell	Drilled
			Shell	4 shell	None
			Sea urchin	35 fragments	None
			Fish	1 bone fragment	None
			Fish	2 mandible fragments	None
			Fish	11 fin ray bones	Some modifications
			Fish	128 fin ray bones	None
			Turtle	Bones fragments	None
			Bird	4 bones	Worked
			Bird	4 bones	None
			Mammals	2 bone	None
			Mammals		Fragments
Burial XIX	Male	20 to 30 years	*Carcharhinus* sp.	1 vertebrae	Drilled
			Shells	12 shells	Some modifications
			Shells	2 shells	Drilled
			Fish	2 bones	None
			Bird	1 bone fragment	None
			Mammal	1 bone fragment	None
Burial XXIV	Female	40 to 50 years	Great white shark, *Carcharodon carcharias*	9 teeth	Drilled
			Olivella verreauxi	3 conch shell	None
			Olivella verreauxi	3 conch shell	Some modifications
			Turtle	1 shell	None
Burial XXV	Male	25 to 30 years	*Carcharhinus* sp.	1 tooth	None
			Shells	1 conch shell	Some modifications
			Shells	2 conch shells	Drilled
			Shells	1 conch shell	None
			Fish	1 bone fragment	None
			Mammal	1 bone fragment	None

Table 21.5. The burials with remains of sharks and rays at Tenório Site.

Discussion and Conclusions

Recognizing that these elasmobranch remains are grave goods (Rhor 1977) permits archaeologists to better understand the social structures they reflect. They reveal a social complexity marked by hierarchy or stratification (Prous 1991; Milheira 2005). It is also worth noting that elasmobranch remains are rare as grave goods when compared to the other kinds of worked osseous materials, such as polished and splintered tools for everyday use, and unmodified bone materials (Milheira 2005).

The remains of sharks and rays are unique to burials on the coastal sites studied here (Kozuch 1993; Taylor 1993; Luján 1994). The study of shark and ray remains in these burials from the Brazilian coast sheds light on the symbolic significance of elasmobranch species among these fisher-gatherer groups.

The remains of elasmobranch species deposited in these burials are abundant and very diversified (teeth and vertebrae of sharks and rays and spines of rays), although the diversity seen in the burials is not the same as what has been found in the faunal material (Gonzalez 2006). There were no significant differences in the proportion of sharks and rays associated with the burials of children, women, and men. However, these finds are predominantly associated with men and women who died between the ages of 20 and 30 years.

Clearly some elasmobranch species were preferred as grave goods. Of the 16 species identified in the faunal material at these sites, only the bull shark (*Carcharhinus leucas*), the tiger shark (*Galeocerdo cuvier*), the great white shark (*Carcharodon carcharias*), the sandbar tiger shark (*Carcharias taurus*), the hammerhead shark (*Sphyrna tiburo*) and the sawfish (*Pristis* sp.) were used as grave goods. Of these six species, only three are well represented: the bull shark (*Carcharhinus leucas*), the tiger shark (*Galeocerdo cuvier*) and the white shark (*Carcharodon carcharias*).

The association of these particular species with burials does not reflect their abundance at the archaeological sites. The sandbar tiger shark (*Carcharias taurus*), spotted eagle ray (*Aetobatus narinari*), and cownose ray (*Rhinoptera bonasus*) are more abundant in the archaeological faunal record than the tiger shark (*Galeocerdo cuvier*) and the great white shark (*Carcharodon carcharias*), showing these two species were deliberately chosen as grave goods (Gonzalez and Amenomori 2003).

According to Anderson (1969), fishing groups in southern regions of the Indian-Pacific Ocean call certain species of fish sacred based on their anatomical and behavioral features. Large, very aggressive elasmobranch species are most likely to become sacred species among these fisher-gatherer groups of coastal Brazil. The most noteworthy physical and behavioral characteristics of these species include the different dentitions and coloration in the white shark and tiger shark and the unique fact that the bull shark occasionally swims up river from the coast.

Gonzalez (2005a) has shown that such features could easily have led these coastal groups to consider shark species sacred. The species proportions from the burials show that, apart from the Tenório site, elasmobranch species appear in higher frequencies in burials than other kinds of animals. Elsewhere in the Pacific Islands, the bones of species such as the great white shark (*Carcharodon carcharias*) and the tiger shark (*Galeocerdo cuvier*) are often deposited in burials and made into tools. These sharks represent gods and fertility (Taylor 1993) to these Pacific peoples. The ray of the sawfish species (*Pristis*) is often found in burials (1400 years BP) in Mexico and Panama. It is also found frequently in the iconographic record at the Templo Mayor; it represents a god and fertility symbol (Luján 1994; McDavitt 2002).

The ritual use of skeletal elements or images as symbols can be observed in the composition of the offerings as well (Renfrew and Bahn 2000). The similarity in species present (when compared to species that occur at archeological sites on other coastal regions of the world (Borhegyi 1961; Kozuch 1993; Rick *et al.* 2002), along with the aggressive behavior and the economic importance of these species to the fisher-gatherer groups living on the Sao Paulo coast make it very likely that they were considered sacred. The use of their rays and teeth as grave goods suggests that their skeletal elements were also used as protective personal amulets. They were also offerings to insure fish stocks in the area (Severi 2000; Gonzalez 2005b). The association between elasmobranch species and men and women who died between the ages of 20 to 30 years suggests that these fish may be related to fertility issues, just as they were in Mexico and Panama. The presence of the teeth and vertebrae in many of the burials may also be a way of displaying differences in social status between members of the same group (Beckwith 1970; Kamakau 1976; Prous 1991; Luján 1994).

It should not be forgotten that sharks and rays were considered gods in all the Pacific islands as well as in pre-conquest Central America. The loss of this feature of religious life occurred after the introduction of Christianity during European colonization (Taylor 1993). It is very likely worship and reverence of these fish species was a worldwide phenomenon among coastal groups. Indeed, one also finds a worldwide change in attitudes toward these species as the belief systems of these societies were forcibly altered through religious conversion. Thus, the shark gods of pre-contact society were transformed into the demon sharks of the colonial and present-day world.

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22. Tupilak Transformations: Traditional Ivory Objects as Modern Souvenirs

Bonnie C. Yates and Margaret E. Sims

*For centuries, humans have carved ivory and bone into useful objects. In Greenland, a cultural tradition involves carving whale tooth ivory into anthropomorphic figures called tupilaks. In modern times, tupilaks of unknown material have appeared as souvenirs in commercial shipments in the wildlife trade. Forensic Scientists at the National Fish and Wildlife Forensics Laboratory (NFWFL) are asked to identify the taxonomic origin of ivory carvings such as these in order to support wildlife law enforcement. Carved ivory items received as evidence at the NFWFL must be identified to the species level, when possible, for effective prosecution. These carvings often lack diagnostic characteristics of the original element; hence this research presents those distinctive features useful for forensic identification purposes. A series of teeth from sperm whale (*Physeter catodon*) and killer whale (*Orcinus orca*) were examined to document morphological characteristics that can be used to distinguish large teeth after they have been severely altered by carving. A detailed macroscopic examination of known whale tooth specimens includes two components: 1) non-destructive metric analysis and gross morphological study of whole teeth, and 2) examination of cementum structure in available sectioned teeth. Our observations reveal distinct differences in cementum structure that can be seen in commercially carved whale tooth ivory.*

Keywords: tupilak, *tupilaq*, whale, teeth, ivory, cementum, *Physeter catodon*, *Orcinus orca*

Origins of the Tupilak

Ivory objects and carvings have captivated artists and collectors worldwide throughout time. The modern tupilaks (anthropomorphic figurines carved from ivory) from Greenland are no exception (Fig. 22.1). The origins of the tupilak/*tupilaq*/*tupilait* are lost to the unrecorded history of the Greenland Inuit. Greenland, the world's largest island, has been home to the Inuit for millennia. From earliest documented Saqqaq culture (2400–800 BC) through the Early Middle Ages, contact with other cultures was very limited. Then the Norse settled in Greenland at the end of the AD first millennium. After that, brief and sporadic attempts to Christianize the Inuits were made until the early 1400s (Dahl 2000; Morey and Aaris-Sorensen 2002). Not until 1721 did a joint Danish/Norwegian settlement result in lasting European presence and influence (Ehrlich 2001). Both of these incursions affected the Inuit. In the present study, we note how the tupilak's construction and purpose persisted until very recent times; then both construction and purpose changed to accommodate cultural changes among the Greenland Inuit.

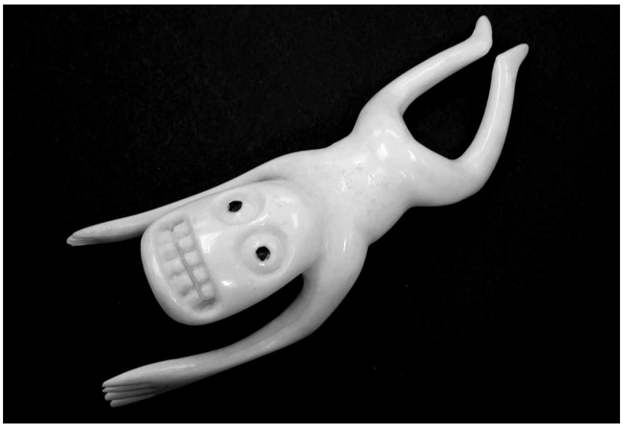

Figure 22.1. Modern tupilak carved from whale tooth ivory (Greenland handicraft).

The earliest tupilaks were made from driftwood, old bones and scraps of skins, cobbled together to create a passable marine mammal likeness, which was then imbued with spells and incantations provided by the local shaman or by the individual who wanted to exact revenge for a grievance onto another Inuit. Tossed into the sea, it waited for the intended victim to harpoon it, at which time the evil intent would be released onto the hunter. Peter

Freuchen (1961) wrote the following account from his 15 year sojourn there:

> Another method for an angakok [shaman] to do evil to an enemy is that of creating a tupilaq, a hell animal. He does that by collecting bones from various animals and putting them together into a skeleton, which he then wraps in a skin. He puts it in a prescribed place, and after much conjuring it becomes alive and swims across the path of the hunter who is to die. As soon as this hunter has harpooned it, he is doomed.

The tupilak's purpose, then, was to cause harm or to defeat an enemy or rival. This dark purpose persisted throughout the Norse occupation, changing dramatically only when Christian missionaries demanded an end to any sort of sorcery. The change was to streamline the tupilak's size and obscure its mission. Instead of imitations of living marine mammals, they became small representations of them. The only device to indicate they retained some supernatural force was subtle alteration of body parts in the animal figurines they carved.

These carvings, generally produced on walrus or whale teeth, suggest that shamanic conjuring was still active in the figurines. Shapeshifting or *hamskifte* (Schnurbein 2003) has always been a mainstay of Arctic shamanism (Kehoe 2000; Harner 2006). By the shaman's changing into a bird or mammal to enter the Otherworld to seek knowledge, he/she could then assist the community in matters of healing, predicting, punishing, or persuading (Walsh 1990). "A shaman is a 'technician of consciousness' who utilizes ["psychobiological"] potentials for personal and social transformations" (Ogembo 2005, citing Winkelman 2000). These later tupilaks, as well as the modern ones, show legendary characters transforming from human into walrus, bear, or something completely imaginary or indescribable to an outsider (Fig. 22.2).

Transformation, therefore, becomes the pivotal concept for these objects, as well as for the culture. Not only does the carved image appear to be in mid-transformation from human to animal (or vice versa), but the natural object has been transformed by the carver. It is no longer a whale tooth, but now a symbol. Winkelman (2004, 202) suggests that it was exactly this shamanic use of "metaphorical representations," such as the projection of anatomical relatedness (derived from associating a part to the whole), that transformed human thought processes to the level of art.

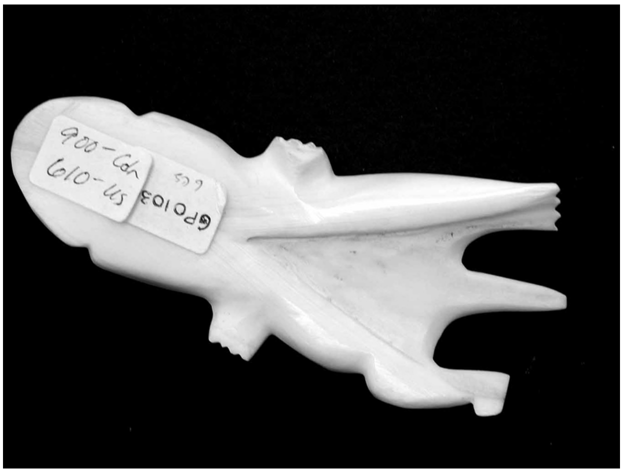

Figure 22.2. Anthropomorphic tupilak figure showing one human foot, one flipper, and tail.

The cultural history also has been transformed; isolated shamanic peoples adapted to dominant influences by simply changing the mode of one of their more sinister ritualistic objects into seemingly harmless figurines. Gradually, as trade increased between Greenland and the outside world over fishing resources, including ivory, whale oil, and cod (Perdikaris and McGovern 2007), it was inevitable that the crafts of the Inuit would attract attention of the traders, followed by interest of anthropologists (McGhee *et al.* 1976) and art historians (Romalis 1983). A study was conducted over a ten-year period (1966–76), which found a 400% increase in carving over hunting by adult men along the East Coast (Enel 1981, 129). Today, *tupileq* (plural) comprise a significant category in the Greenland Inuit repertoire of *eqqumiisuliaat*, or "something strange" – fitting the new concept of art as commerce (Kaalund 1983). Tourism has further encouraged this transformation, and carving *tupileq* from bone and reindeer antler now constitutes the primary source of income in villages such as Kulusuk (Rósa Rut Þórisdóttir 2000).

The following quote is excerpted from a Nunavut newsletter:

> Today, however, Inuit create art that is more skilled than ever before. They make films and write stories about traditional beliefs – free from fear of punitive theocrats. Elders break long silences, ever shy about recording their old tales. And animals have, through some miracle, lost none of their importance to Inuit.
>
> Ultimately, Inuit deserve to be proud. They exist in a state system, and have still maintained their connection to the land. Many cultures are not so lucky. Like a final gift from traditional cosmology Inuit culture has shifted its own shape, becoming some strange, wonderful, new animal of the world (Qitsualik 2002).

Modern Tupilaks in Wildlife Trade and Forensic Casework

The distance between the geographic origins of ivory raw material to a final commercial destination can be continents apart. For example, hippopotamus ivory from Africa (the large tusk-like canines and incisors) is often carved in Asia and finally sent to the United States for purchase by collectors and souvenir buyers. Tupilaks are also carved, marketed, and sold across international borders. When commercial shipments arrive in the United States, they are often inspected by law enforcement officers for improperly declared or suspected illegal material. Because ivory-bearing species are differentially protected by law (sperm whale is listed on the Endangered Species Act, orca is not), an effective prosecution requires species-level identification. As part of the legal process after items have been seized, the National Fish and Wildlife Forensics Laboratory (NFWFL) is responsible for the identification of wildlife parts and products that are confiscated from U.S. port inspections. An assemblage of confiscated ivory figurines (tupilaks) of unknown species origin was submitted to the NFWFL by wildlife law enforcement investigators for identification. They were assigned to the Morphology Section of the Lab to be identified using standard ivory identification protocols. The items were examined visually, and identification was made by macroscopic comparison with reference to a collection of known ivory standards from several species sources and published literature.

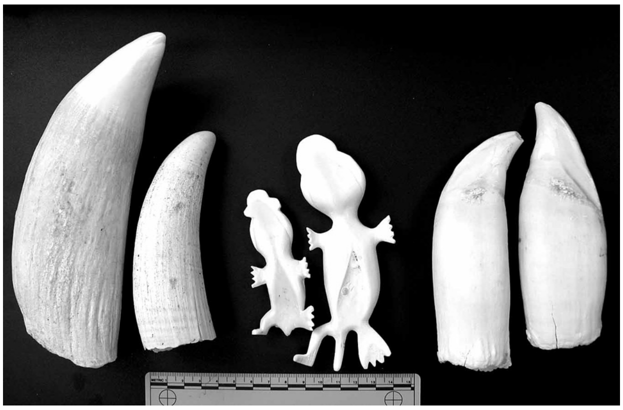

Figure 22.3. Large and small sperm whale teeth (far left pair) compared to orca teeth (far right pair) and evidentiary carvings (middle pair).

Wildlife Forensic Analysis

The Morphology Section of the laboratory uses visual and microscopic methods to identify a wide range of evidentiary wildlife material to a family, genus, or species. This casework drives research that involves finding species-specific characteristics of wildlife parts and products when few characteristics of the original element remain. Documentation of geographic origin is rarely available in wildlife forensic casework, so provenance information of the tupilak assemblage was not known at the time of analysis. Gross morphology of known whale tooth specimens was analyzed and measurements of whole and sectioned teeth were recorded. Destructive testing cannot be used by law enforcement personnel during inspections, so it was important for us to investigate a practical field identification method.

There are 22 toothed whale species, excluding dolphins and monodontids (Wilson and Cole 2000). Sperm whale (*Physeter catodon*) teeth are the most commonly used whale teeth in the commercial ivory trade. Orca (*Orcinus orca*) teeth have also been found mixed into large assemblages. Because orca teeth overlap in size with smaller sperm whale teeth, and the two species are protected differently by law, orca must be considered when identifying smaller whale tooth carvings.

Samples from the ivory standards collection at the National Fish and Wildlife Forensics Laboratory and loaned specimens were analyzed in this study. Specimens included carved tupilaks, whole sperm whale and orca teeth, and sectioned teeth of both species. Orca tooth samples were limited due to availability, especially sectioned teeth.

Sperm whales have 32–60 teeth on the lower jaw (upper teeth are vestigial). They are conical in shape, curved, lack enamel, and vary in size up to 20 cm in length. Tooth diameter varies from 2.5 to 15 cm (Hillson 1986). The cross-section is oval, showing thick cementum (Perrin and Myrick 1980) and concentric dentine rings (Espinoza and Mann 1991). Sperm whale teeth cover a generally wide range of shapes and sizes (overall size can vary along the tooth row). Sperm whale teeth in the middle of the tooth row are large (significantly larger than orca teeth), while the anterior- and posterior-most teeth are relatively small and therefore overlap in size with orca (Fig. 22.3).

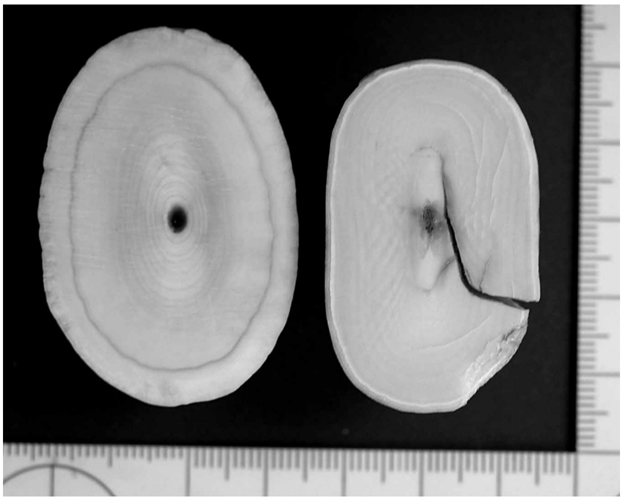

Figure 22.4. Transverse cross sections of sperm whale tooth (left) and orca tooth (right).

Orcas have up to 80 teeth (Hillson 1986). They are conical in shape, curved, have enamel at the crown, and are generally uniform in size and shape. Measurements from this study (n=11) indicate an average greatest length of 11 cm and an average greatest diameter of 3.5 cm. Individual teeth are compressed on the anterior and posterior sides, resulting in a cross-section more rectangular than oval (Fig. 22.4). Orca teeth have a thin cementum layer (Scheffer and Myrick 1980) and concentric dentine rings.

From longitudinally split whale teeth, such as the unidentified tupilaks in question, orca teeth are distinguished from sperm whale teeth by having a very thin cementum layer. The average cementum thickness in sperm whale (n=11) is 4.5 mm. The average cementum thickness in orca (n=11) is 0.6 mm (Fig. 22.5). The cementum layer is often present even on small carved ivory objects, such as women's jewelry. Although the objects had been severely

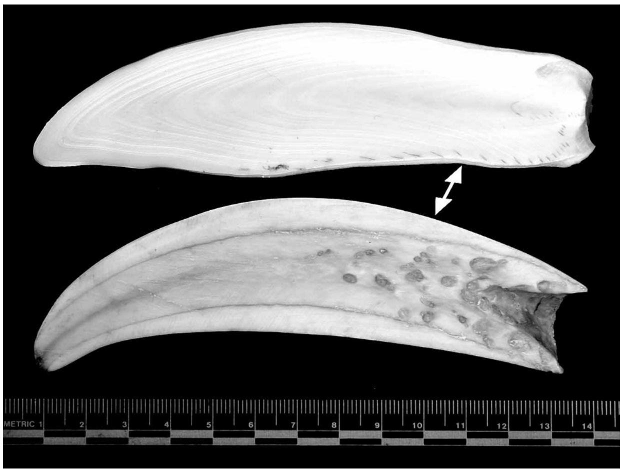

Figure 22.5. Longitudinal section of sperm whale tooth with a thick layer of cementum as the outermost layer (bottom) and orca tooth with barely visible thin cementum (top).

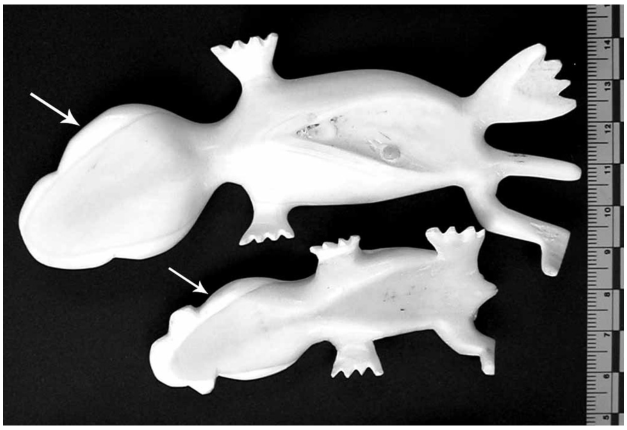

Figure 22.6. Tupilak carvings with thick cementum, indicating source as sperm whale tooth.

carved and altered from their original tooth morphology, the thick cementum in sperm whale teeth is readily distinguished from orca and was used to identify the tupilaks in the evidentiary assemblage submitted to the Forensics Lab (Fig. 22.6). Seventeen tupilaks were carved from sperm whale teeth, one tupilak was carved from a walrus (*Odobenus rosmarus)* tusk tip (identified by the presence of prominent secondary dentine), and one tupilak was carved from an unidentified whale tooth later identified as a narwhal (*Monodon monoceros)* tusk segment.

In summary, our research reveals distinct differences between sperm whale teeth and orca teeth that are evident in carved objects. Research of whale tooth morphology enables forensic scientists to determine species of origin of evidentiary assemblages in wildlife forensic casework, ultimately supporting law enforcement efforts to reduce trade in protected species while efficiently processing legal objects. Non-destructive methods of identification such as the one used in this study often have great utility in field inspections of wildlife material. Although the species source of the tupilak figures is consistent with most commercial whale tooth ivory assemblages analyzed at the Lab, the human/animal relationship aspect of their cultural history is an enlightening and valuable part of the analytical process of identification.

Acknowledgements

We are very grateful to the following people for the loaned specimens used in this study: Jim Dines, Natural History Museum of Los Angeles County; USFWS Wildlife Inspector Mike Williams; James Houseman and Mark A.S. Oswell, NOAA. Thank you to Darby Morrell and Jim Chamberlain for technical support. Thank you to Alice Choyke and other editors for supporting and arranging a means to share this information through publication. We would also like to acknowledge our wise and friendly ICAZ colleagues for accepting us into their group of bone and tooth aficionados.

Note

Since drafting this paper, the U.S. Fish and Wildlife Service added the Southern Resident killer whale DPS (distinct population segment [Orcinus orca]) to the List of Endangered and Threatened Wildlife. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0IL#status

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23. The Birds And Animals In Ancient Armenian Art

Ninna Manaseryan

Thousands of historical-archaeological and architectural monuments are scattered on the peaks of numerous mountains, in deep canyons, caves and in highland areas of Armenia. They are wonderful manifestations of sophisticated development, delicate taste and the strong will of the population inhabiting this area for millennia. Realistic works of art on rocks number among these mysterious sites – monuments to ancient human culture.

Zoomorphic figurines in stone and clay discovered during excavations at Early and Middle Bronze Age sites, occupy a special place among the various subjects of ancient art. Undoubtedly, these figurines of clay, stone and bronze had a decorative role as well as importance in cults while the variety of shapes suggests that they may have served different purposes. Some decorated carriage poles while others would have been ornaments in sanctuaries and shrines while some figurines-pendants were amulets for protection against spirits and ghosts. As local productions they kept their meanings over thousands of years.

Thus, everything that scholars have managed to discover, decipher and tell is only a small part of this diverse and endless world of ancient art. Surely, many pages of culture history are waiting from the past in art which will add to the treasure of beautiful types yet to be discovered. What is available at present is a source of data testifying to one thousand years of cultural and historical development, comprising a history of constant development from primitive technologies to the construction of fortresses and temples, villages and cities, as well as these unique masterpieces of art.

Keywords: Bucrania, rock carvings, zoomorphic figurines, clay figurines, world of art

Petroglyphs depicted on Armenian mountainsides (Fig. 23.1) represent the sacred places for hunter-pastoralists, "temples" of ancient art that reflect the diversity and richness of the animal world (Karakhanian 1970, fig. 154). Among the large numbers of zoomorphic carvings sometimes found, there are images of mostly deer, goats, dogs and cheetahs, as well as fine depictions of birds (Martirosian 1971, fig. 269). The peculiar features of the local culture are reflected in stelae known as *vishaps*, or "dragon stones" scattered all over Armenia (Fig. 23.2). They often resemble large fishes with glyphs of birds and heads of bulls and sheep. They are thought to have been guardians of springs (Piotrovski 1939, 12).

Zoomorphic sculptures such as the stone and clay

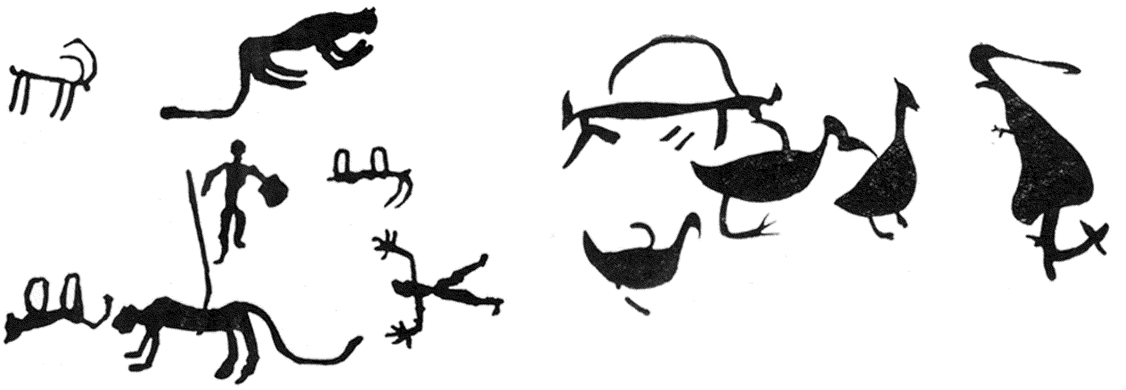


Figure 23.1. Armenian petroglyphs (Syunik and Gegham mountains).

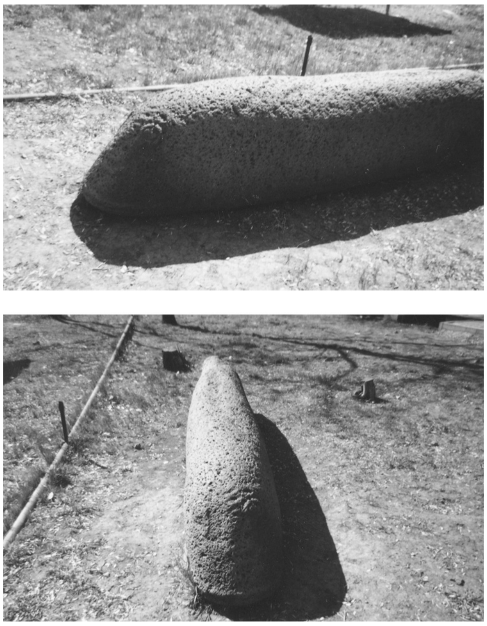
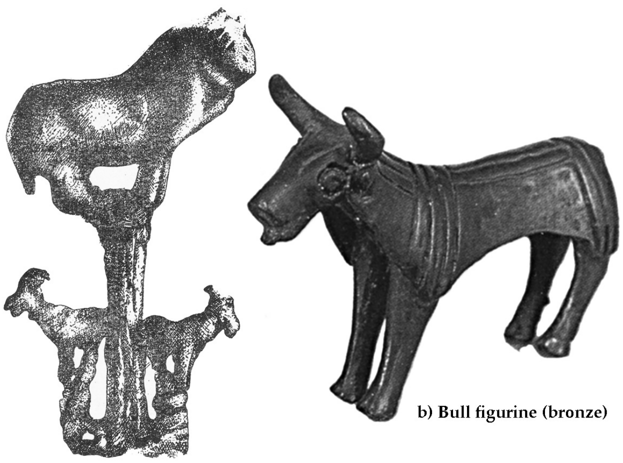


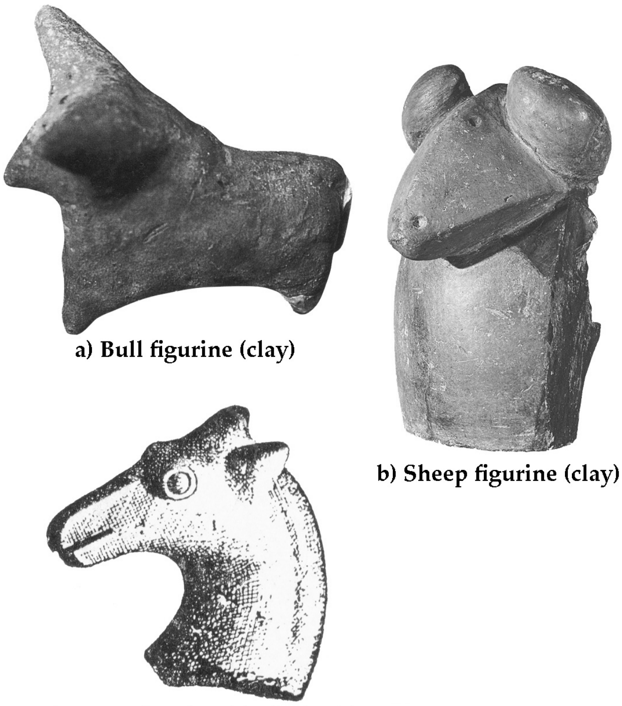
Figure 23.2. "Vishaps" (dragon stones).



b) Bull figurine (bronze)

a) Bull figurine, Ilstd. by R.O. Harutyunyan

Figure 23.4. Bronze bull statuettes from Lchashen (left) and Ayrum (right).

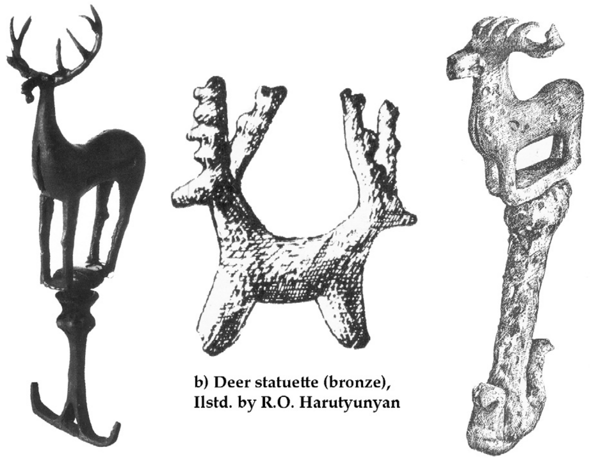


a) Bull figurine (clay)

b) Sheep figurine (clay)

c) Horse figurine (clay), Ilstd by R.O. Harutyunyan

Figure 23.3. Clay figurines of bulls from Arich, sheep from Amasia and horse from Shengavit.



b) Deer statuette (bronze), Ilstd. by R.O. Harutyunyan

a) Deer statuette (bronze)

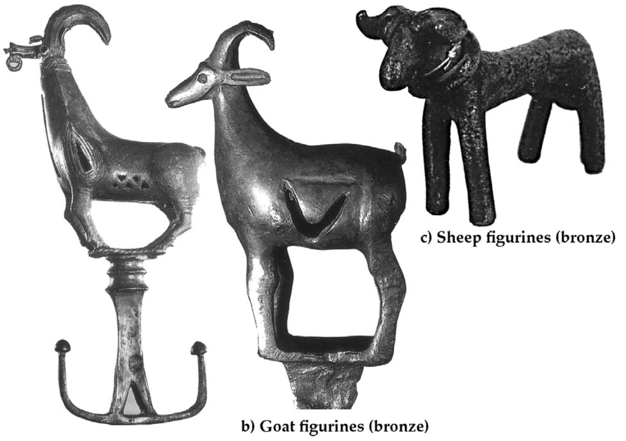
c) Deer statuette (bronze), Ilstd. by R.O. Harutyunyan

Figure 23.5. Bronze deer statuettes from Tolors (left), Nor Bayazet (middle) and Lchashen (right).

figurines discovered at excavations of archaeological monuments of the Early and Middle Bronze Age occupy a special place among various subjects of ancient art. Clay figurines of bulls are rather realistic, and their characteristic features, such as horns, large bodies, and short legs are exaggerated (Khachatryan 1975, 77, 80). Sheep figurines have been found in Amasia, Arich, Djerahovit and Mokrablur (Khachatryan 1975, 78, 80). A clay figurine of a horse head from Shengavit (Fig. 23.3) with incised eye circles and prominent small ears has been reported in Sardarian's book (1967, 200). Some clay figurines of dogs may indicate their crucial role in herding livestock (Yesayan 1980, table 7; Khachatryan 1975, 77).

In ancient Armenian art a special place is given to the numerous and varied sculptures of the Late Bronze Age. Some of the most expressive works are bull figurines. Bull sculptures from Lchashen are large and voluminous, including one that sits on an open-work stand and whose edges are decorated with goat statuettes (Fig. 23.4). Another bull was placed on an anchor-like stand with birds' heads (Yesayan 1980, table 7, 27).

Deer statuettes (Fig. 23.5) are another example of rare ancient works of art. A small deer figurine made of scoria from Lchashen is fastened to a stand, the edges of which are decorated with birds' heads. The deer statuette from Tolors has an elegant body, slender legs, small head with a long

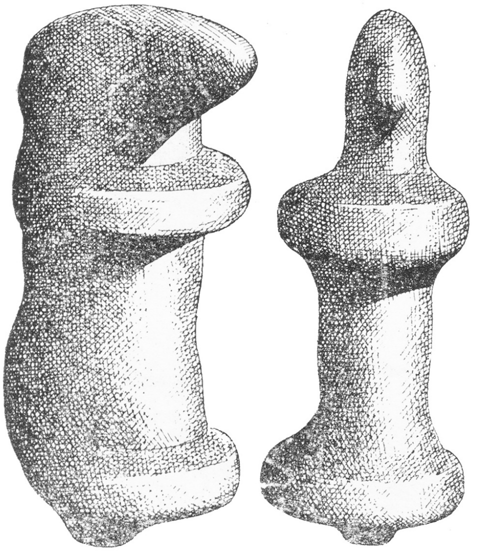


a) Goat figurines (bronze)

b) Goat figurines (bronze)

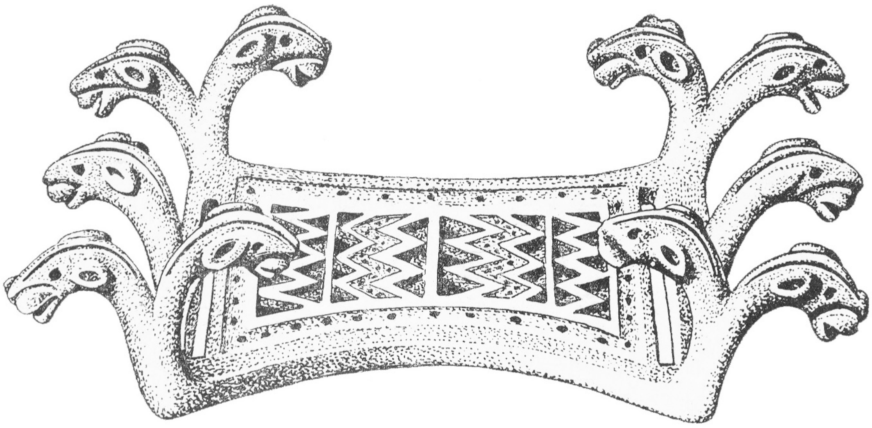
c) Sheep figurines (bronze)

Figure 23.6. Bronze goat statuette from Artik (left), Getashen (middle) and sheep from Nor Bayazet (right).



Dancing bears (clay) , Ilstd. by R.O. Harutyunyan

Figure 23.8. Dancing bear.



Open-work belt buckle with lion heads (bronze) Ilstd. by R.O. Harutyunyan

Figure 23.7. Bronze open-work belt buckle with lion heads from Kirovakan.

muzzle and splendid branching antlers, and three massive ornamented necklaces (Yesayan 1980, table 29, 28).

A bronze goat figurine (Fig. 23.6) on another anchor-like stand, this one from Artik, is hollow with bronze balls inside. It is richly ornamented on the upper part of the neck. The statuette from Artik illustrates the mastery of metal craftsmanship by the artists of the Late Bronze Age in the territory of present-day Armenia. It resembles statuettes derived from burial complexes in the Sevan Lake Basin (Khachatryan 1963, 133).

A large group of Late Bronze Age statuettes consists of bird figurines that vary in their forms. Some were fastened to open-work, anchor-like stands with the help of a ball joint. Pendants were decorated with open-work images of birds. Other bronze statuettes served as decorations for carriage poles, while still others ornamented sanctuaries and chapels. A third group consists of amulets for protection and for conjuring ghosts.

A large variety of bird-shaped, open-work pendants/amulets decorated with wedge-shapes and oval depressions have been discovered in Iron Age burial complexes. Almost all the pendants had metal balls inside the hollow figurines, which produced melodic sounds for conjuring the ghosts when shaken (Khachatryan 1975, 185, 209).

Lion images (Fig. 23.7), symbols of power and strength, were depicted on dagger sheaths, belt buckles, and open-work drilled on carriages (Yesayan 1980, table 37).

Sitting frog figurines were attached to lion figurines on bronze open-work parts of carriages from Lchashen, (Yesayan 1980, table 37a). The frog, which symbolized water and fertility, is seldom found on anchor-like stands with birds or on bronze bracelets. Frog cult symbols were frequently represented on medallions, necklaces, pendants and bracelets in the nineteenth century BC and were intended to increase fertility and aid in childbirth.

Of special interest is a clay bear statuette (33 cm height) discovered in the Poploz fortress excavations in the Noemberyan region. The animal's forelimbs and hind limbs are crossed so it looks as though the bear is dancing (Fig. 23.8) (Yesayan 1980, table 52).

A great number of zoomorphic figurines were discovered on monuments from the first millennium BC. Among the bronze dog figurines is one with a bronze wire attached to its neck that appears to be a leash (Yesayan 1980, table 62). Horse statuettes are not numerous in the group of bronze zoomorphic figurines exhibited in the Historical Museum of Armenia.

Similar bronze figurines of goats, sheep, and deer are found in collections from monuments from the first half of the first millennium BC. The figurines include goat statuettes with small suspension rings, bull statuettes with huge heads, large horns, and short, massive legs, and strong bodies covered with a horsehide (Yesayan 1980, table 62).

In spite of some differences in sizes and shapes, the bronze statuettes have many common properties. They are united by their realistic depictions of animals and emphasis on the most characteristic features of the species, such as the strength and power of the lion and bull, the lightness and gracefulness of the deer with its slender neck, the sharp beak of the bird, and goats' beards.

Undoubtedly the clay, stone and bronze figurines studied here have decorative as well as cultic importance, and the variety of shapes suggests they were used for different purposes. Some of them decorated carriage poles, while others, perhaps, were used as decorations in sanctuaries and chapels. Finally, some of the figurines-pendants were amulets for protection from ghosts. Since these objects were locally produced, they retained their function for thousands of years.

Acknowledgements

I would like to thank the management of the National History Museum of Armenia for permission and the opportunity to photograph the museum specimens.

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24. The Transformations of the Quetzal Bird

Carmen Aguilera

This paper reviews the transformation of the quetzal bird through the three main epochs of prehispanic Mesoamerica. This transformation is traced from the veneration of the actual bird through the deification of the bird to a god (half quetzal-half serpent). This creature becomes one of the most important gods of Mesoamerica who, in this final transformation, becomes the planet Venus.

Keywords: quetzal, quetzalcóatl, quetzal headdress, quetzal feathers, planet Venus

Introduction

The quetzal (*Pharomachrus mocinno)* is one of the most beautiful birds in the world. Its range is now restricted to small areas in the cloudy rain forests in the states of Chiapas in México, and Guatemala and Costa Rica in Central America although previously its range extended north into the Mexican states of Oaxaca and even Puebla (Fig. 24.1).

The object of the paper is to study the importance of the quetzal bird (Fig. 24.2) in the religion of ancient Mexicans and how the conception of this bird was transformed through time. The physical characteristics and life of the queztal will be briefly described, along with the way the actual bird was merged with Quetzalcóatl, one of the most important gods in Mesoamerica. I will also describe the transformation of quetzal feathers into a headdress as a sign

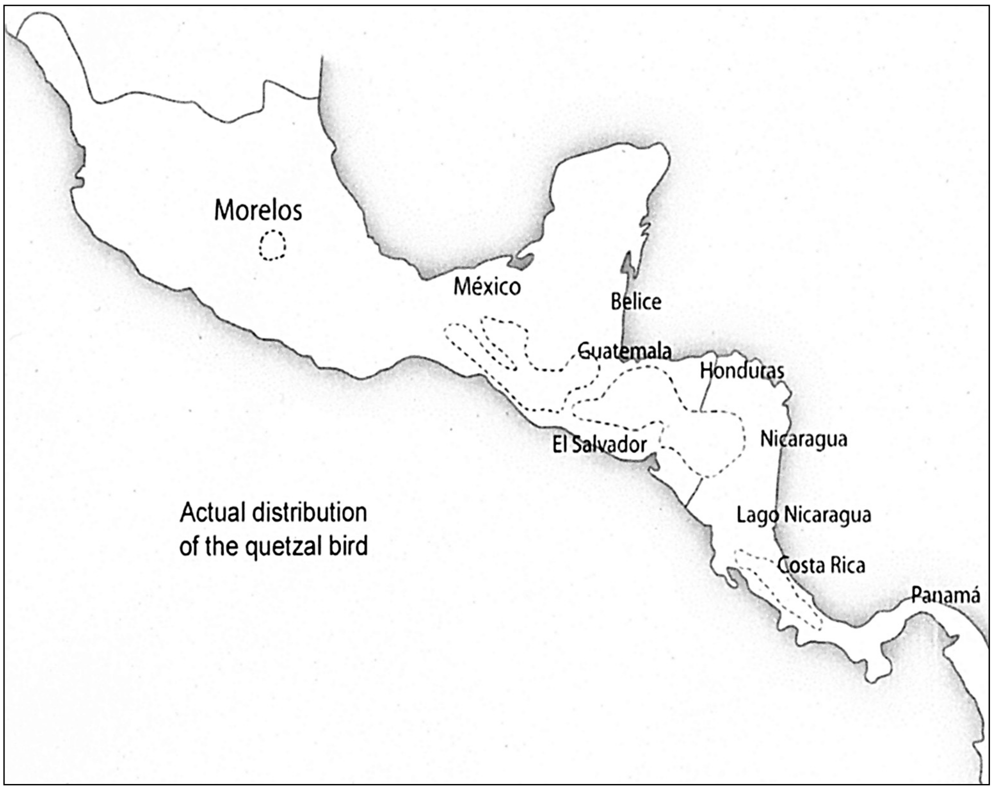

Figure 24.1. Map of Mesoamerica showing the areas of habitat of the quetzal bird after Solorzano and Oyama (2007, 4).

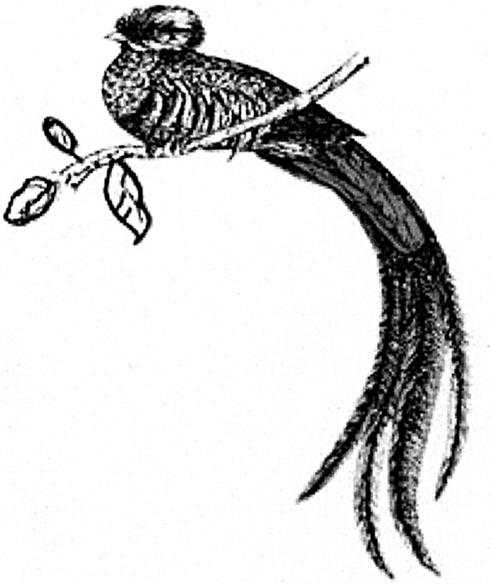

Figure 24.2. Quetzal bird. (Louise Schoenhals, C. A. 1988) Spanish-English Glossary of Mexican Flora and Fauna, 507. Mexico, Summer Institute of Linguistics.

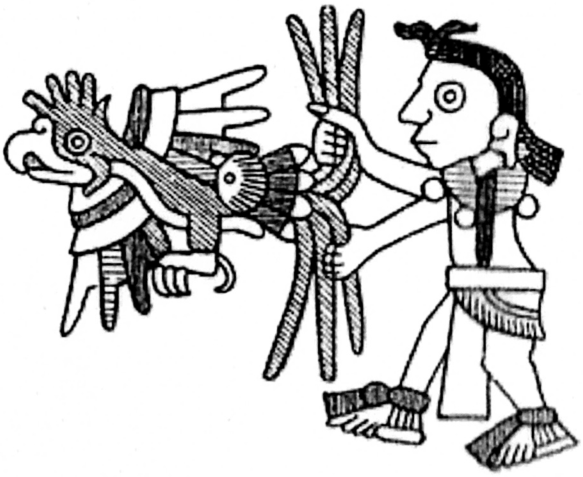

Figure 24.3. Man holding quetzal bird, Codex Nuttall (1902, 71).

of rulership and how Huémac, a late Toltec ruler of the Postclassic period, dressed as a quetzal, left his city in defeat and, in a third transformation, became the planet Venus. The transformation of the quetzal is described briefly for the five periods of Mesoamerican archaeology: Preclassic (2000BC–100AD), Classic (100–650AD), Epiclasic (650–900AD), Early Postclassic (900–1200AD), and late Postclassic (1200–1521 AD). The representations and references to the quetzal appear in ancient reliefs, murals, vessels, and the painted books of both the Prehispanic and early Colonial periods.

The Biology of the Quetzal

The quetzal has a green body, a bright red chest, and a crest of soft feathers on its head that in the pictographic representations is depicted as three or more tufts of short feathers thrown forward. However, the quetzal's most outstanding feature is its outer tail of long shimmering green feathers. In the Maya area the quetzal was called *(ah) k´uk´um*, "the being feathered by excellence" (*Diccionario maya Cordemex* 1980, 420), and in the *nahuatl* speaking areas it was known as *quetzaltototl*, "bird with very valuable and esteemed green feathers" (Molina 1970, 89).

Thompson (1970, 146) wrote that quetzals were caught when they descended from the trees to drink but does not specify the place or time. The 16th-century *Florentine Codex,* which contains more information about the ancient Mexican fauna than any other document, indicates that quetzals were caught at Zinacantan in the State of Chiapas in southern Mexico when they descended to ground level to eat acorns, the fruits of the oak tree (Sahagún 1979, Vol. II, Book IX, Fol. 18v.). The acorns are hard, and quetzals do not actually feed on them. Instead, quetzals feed on the fruit of several species of *aguacatillo* ("small avocado"), plants of the laurel family, as well as fruits of other species that grow in the areas where the bird lives. Quetzals also feed on a variety of insects they catch while perched on the branches of their trees, as well as other small animals like lizards and snails. Female quetzals do not have long tail feathers. They deposit one or two blue eggs in their nests, usually located in holes in tree trunks. Male quetzals take turns sitting on the eggs, although they keep their tail feathers outside the holes in order to avoid damage to them.

Ancient Mesoamericans probably admired the beautiful feathers of the quetzal bird and adorned themselves with them, putting them on their heads and bodies. Eventually, they began to make fans, mantles, and shields and to embellish other objects with quetzal feathers. The quetzal's meat was probably also eaten in times of scarcity, since it is known to be edible today. At first the birds were probably caught by throwing stones at them or shooting them with blow guns or even catching them with by hand. Men plucked the long tail feathers of the male quetzals and set them free so that they could grow another set of feathers. They knew from experience that if they provided food the birds would return. These and probably other practices have led some authors to believe the birds were raised and reproduced in captivity (Tozzer and Allen 1910, 340). Regardless of whether they were raised in captivity or taken from the forest, the hunters handled the birds carefully to avoid damage to the valuable long feathers. The hunters probably wore some kind of gloves made from the soft fibers of green grass or hay, similar to the ones they used to handle the *xiuhtototl* or blue birds *(Cotinga amabilis)* (Sahagún 1979, Vol. II, Book 9, Fol. 18v.). However, in the13th–14th century *Codex Nuttall* (Nuttall 1902, 71), a man is depicted holding the tail feathers of a quetzal bird in his bare hands (Fig. 24.3). This scene probably indicates that the man was a dealer in quetzal feathers, not that the birds were handled in this way.

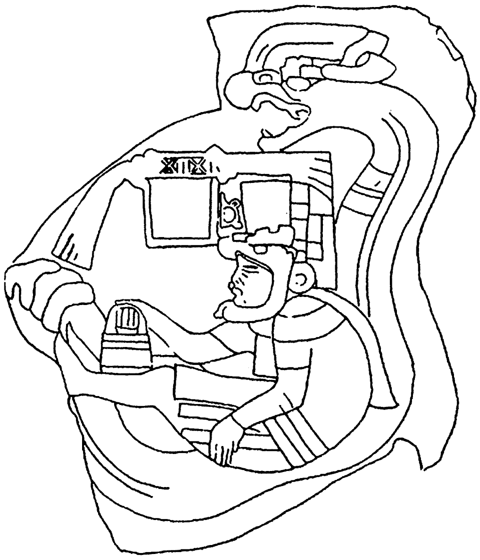

Figure 24.4. First known Quetzalcóatl. La Venta, Tabasco (De la Fuente 1973, 77).

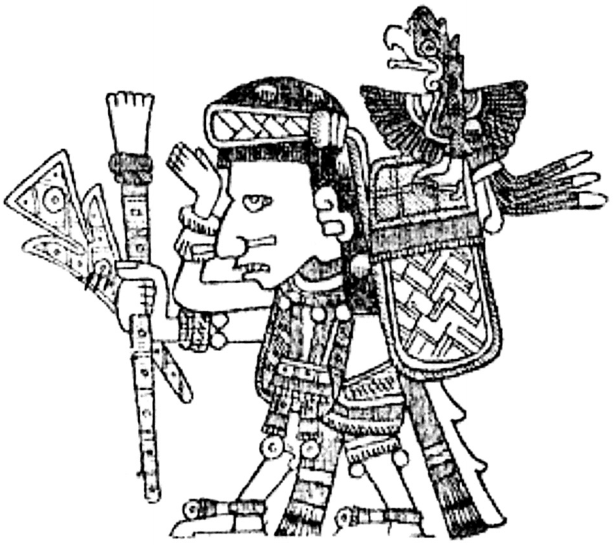

Figure 24.5. Merchant carrying a bundle with quetzal feathers.

The Quetzal Bird is Transformed into a God

The process of the transformation of the quetzal bird into a god was probably a slow one that took place over many centuries. At the Preclassic Monument 19 at La Venta, an Olmec site in the state of Tabasco, a priest appears holding the *xiquipilli*, or priestly bag, in his left hand, while a big serpent with a crest of feathers on its head hovers over him, as if to protect him (Fig. 24.4). Miller and Taube (1993, 141) believe this is the earliest image of the god known as Quetzalcóatl (quetzal serpent), one of the most important gods in Mesoamerica.

North-south trade in prestige items began very early in the Gulf Coast region. Southern riches from various localities that traveled north included gold, jade, amber, cacao beans, and quetzal feathers as seen in *Codex Borgia* (1898), a pre-Hispanic painted book of the 14th-century AD (Fig. 24.5). In this book, a man or god is depicted with a bundle of woven rushes on his back and a small quetzal bird perched on top of the bundle to indicate the man is transporting a precious load of quetzal feathers to his master or to sell. The quetzal feathers were used only by priests and rulers in pieces of attire, such as headpieces and mantles. The feathers were so precious that they were worth more than gold (Hernández 1959, Vol. 3, 319).

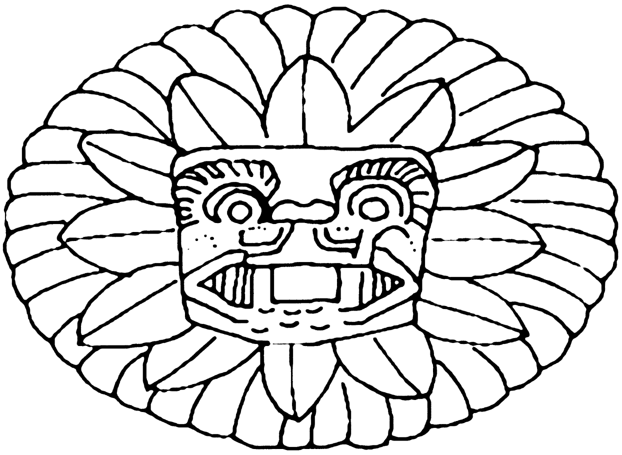

Figure 24.6. Quetzalcoatl head at the temple of the Ciudadela in Teotihuacán, Sala de Teotihuacán. Museo Nacional de Antropología.

Quetzalcóatl at Teotihuacán

Teotihuacán (AD 300–650) was the capital city of a great empire that was located along the route running from the southern Mayan states to the north. It was here that the quetzal bird and Quetzalcoatl, the serpent god, gained in importance. By AD 300, Teotihuacán was already a powerful empire, and the cult of Quetzalcóatl was well established. At the pyramid of the compound known as the Ciudadela, the god is represented as a serpent's head surrounded by quetzal feathers (Fig. 24.6). The outer feathers on the snake are short because the heads had to fit in the narrow friezes of the pyramid. The heads alternate with the god Xiuhtecuhtli, the fire god portrayed also as a serpent's head covered with turquoise mosaic.

Classic-Period Teotihuacán has been called the painted city by scholars because of its many murals. The quetzal bird is often seen in representations from this period, but until recently it has proved difficult to identify it from these depictions. The birds depicted with long green feathers are generally just called large birds or simply birds although some can now be identified as quetzal birds since they are shown with one specific trait that has only recently been recognized.

In Techinantitla, one of the boroughs at Teotihuacán, a fresco shows a bird with green feathers on a red background (Fig. 24.7). A large scroll emerges from its beak to show he is emitting not a song, as it is usually the case with speech scrolls, but a war cry. This can be identified by the size of the scroll and the foot prints pointing upwards in

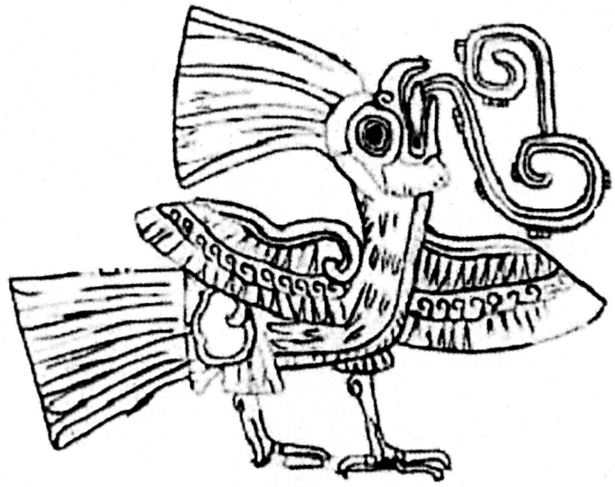

Figure 24.7. Quetzal bird from Techinantitla, Teotihuacan, (after Berrin 1988, 167).

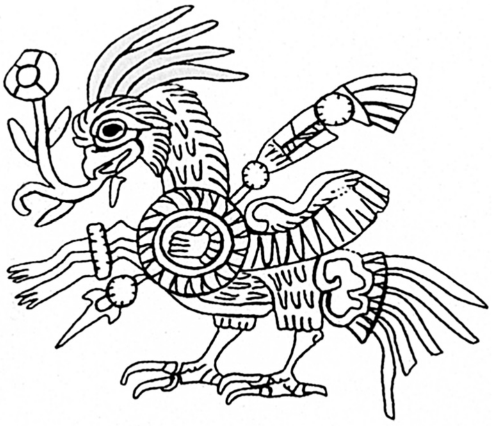

Figure 24.8. Quetzal bird as a warrior, Techinantitla, Teotihuacan, (after Berrin 1988, 172).

disarray. The bird is unmistakably a quetzal not because of its green feathers but because of the band with small scrolls at the back of its extended wings. The small scrolls are called *tzicoliuhqui* meaning "something curved." This word appears in the written description of the quetzal bird in the 16th-century *Florentine Codex* (Sahagún 1979, Vol. III, Book XI, fol. 20r. y 21 v.), a manuscript that contains the largest collection of texts dealing with the cultures of ancient México. It was written by a Franciscan friar, Bernardino de Sahagún and his assistants, who were his former disciples. Here, the main characteristics of the quetzal bird are described, and these match those of the painted figure in Techinantitla. They include a pointed beak, yellow legs, a small feathered crest on its head, and a band of small curved feathers on the reverse side of its outstretched wings**.** This trait has previously not been recognized, but it can be used to definitively distinguish the quetzal from parrots and other green birds. The Techinantitla bird holds a shield and lance and flowers emerge from its beak, indicating a warrior's song. Another quetzal at Teotihuacán, also from Techinantitla, also reveals the war-like aspect of the quetzal (Fig. 24.8). It is difficult to understand why such a peaceful beautiful bird was related to war. It is possible that at one point, good warriors were thought to come from the places where quetzals birds lived.

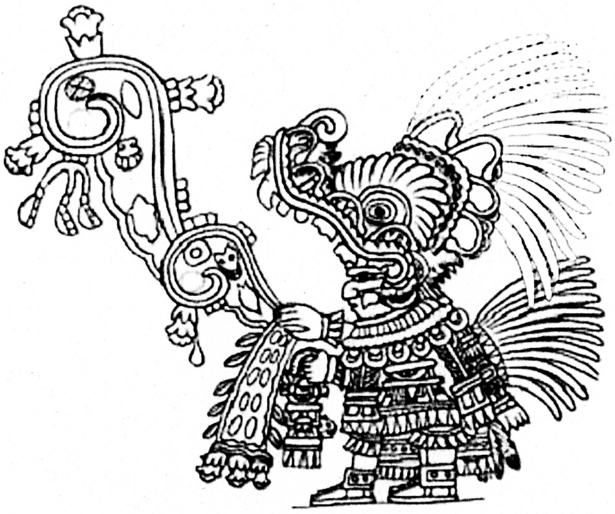

Figure 24.9. Priest making an offering in Teotihuacán, (after Miller 1973, 101).

Another example of a man with quetzal feathers, also at Teotihuacán, is an important richly dressed priest, praying for or bringing fertility (Fig. 24.9). He holds the *xiquipilli* in his left hand. Two big scrolls with symbols of fertility and abundance, including a drop of water, a shell, and a jade bead, emerge from his right hand. A stream of seeds and flowers falls downward. The priest wears a crocodile helmet that ends in a fan of long, curved, soft green feathers that are surely from a quetzal. These feathers are different from the shorter red plumes from a fan on the priest's back that are probably macaw (A*ra macao*) feathers.

The Quetzal Bird in Cacaxtla

Cacaxtla, dated to ca. 650 and located in the state of Tlaxcala, was an important elite site settled by merchants. A famous battle mural with warriors dressed as quetzal birds (Aguilera 2008) was painted on the wall of one of its palaces. The warriors wear helmets in the shape of the head of a bird, a fan of long green feathers hangs down their backs, and a line was strung with quetzal feathers tied to their outstretched arms to simulate the wings (Fig. 24.10). The warriors are probably Maya because of the bump on their noses and lighter skin, while their enemies are darker and wear bands on their heads and a cape of ocelot skin. This outfit suggests they are people from the north. The scenes refer to a war fought to conquer and control this rich merchant post. It seems strange that in this battle the Maya warriors, with their beautiful quetzal costumes, are shown being defeated by the darker peoples from the north clad in jaguar mantles. Cacaxtla endured centuries of power struggles, and the battle mural is the only fragment that remains of the many scenes probably painted in this compound. Possibly the mural is part of,

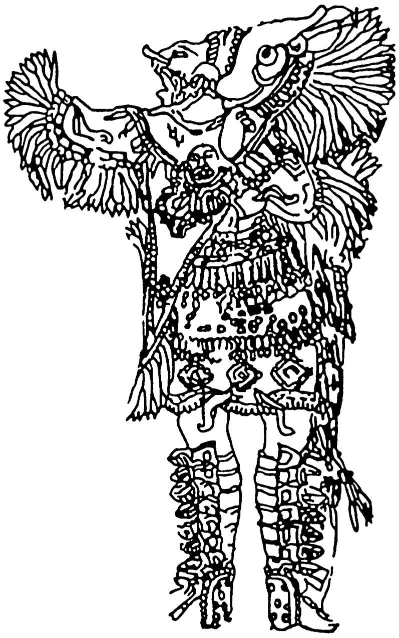

Figure 24.10. Quetzal warrior from Cacaxtla (after Lombardo de Ruiz et al. *1986, First folder).*

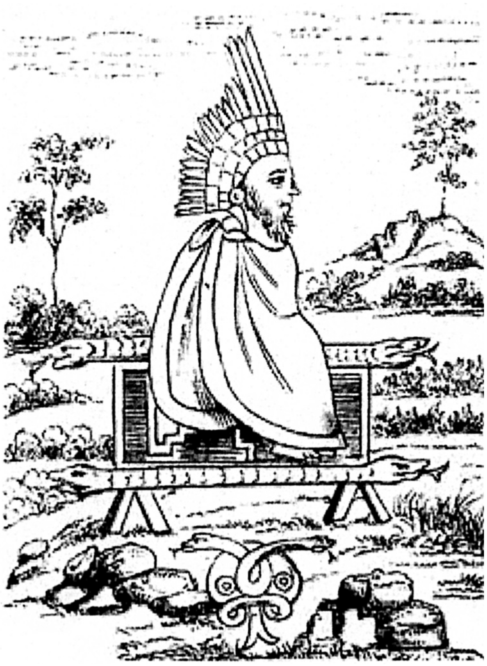

Figure 24.11. Huémac, the last lord of Tula (after Durán 1967, Atlas, 1967, Illustr.1).

and perhaps the only chapter that remains, of a complete history. It is also possible that the less cultivated peoples from the north, lacking good artists, forced the defeated professional Cacaxtla artists to paint the mural. They produced a splendid painting of unparalleled beauty.

The Quetzal Headdress is Transformed into a Complete Quetzal

By the early Postclassic period, the quetzal feather headdress was transformed into or came to represent an entire quetzal bird in people's minds. For this period there are written and pictorial colonial texts with information about the quetzal bird and the quetzal headdress. The ancient Mexicans and the Christian friars in the highlands wrote both in *nahuatl*, the language of the Mexicas or Aztecs, and in Spanish. Numerous data and images of the quetzal bird and the god Quetzalcóatl may be found in these texts.

Huémac was the last lord of Tula, the capital of a powerful state, who ruled at the end of the Early Postclassic (AD 1200). He has been closely identified with the god Quetzalcóatl. According to the myth, he was forced to leave his beloved city of Tula by the god Tezcatlipoca, probably an invader from the Huaxtec or northern lands. In defeat Huemac went to the coast and took to the sea in a serpent's raft, where he immolated himself and became the Planet Venus. The illustrator of the *Historia* of Friar Diego Durán (1967, Vol. 3: Second treatise, 1st Plate) depicts Huemac at the shores of the Gulf of Mexico at the precise time of his departure (Fig. 24.11). He appears seated on a raft of serpents, *cóatl* in náhuatl, wearing a headdress of green feathers and the red mantle of royalty. He is now an impersonator of the god Quetzalcóatl, a word composed of the names of the bird and the serpent, since he appears disguised as a quetzal bird and wears the headdress, and he is seated on a raft of serpents.

The quetzal headdress he wears is made of the long green feathers that are certainly tail feathers from the quetzal because the name of the headdress is *quetzalapanecáyotl*, a word found in two texts of the *Florentine Codex* (Sahagún 1952, Vol. 3, 20 and 1955, Vol. 12, 46). Zelia Nuttall (1904a, 17) was the first to recognize this name and relate it to the famous headdress now held in the Ethnographic Museum in Vienna. Although the exact form of the actual piece and meaning of the word were not known, Nuttall (1904b, 455) stated in an old catalogue that the piece was certainly an Aztec or Mexica headdress (Nuttall1904a, 6), contrary to the ideas of some researchers of her time and later.

The quetzal headdress developed through time so that eventually it was not only a prestigious headpiece made of quetzal feathers but came to represent a complete quetzal. Huémac's image is shown in profile but if he were to turn his head towards the observer it would be apparent that the headdress is meant to show a complete quetzal. The higher middle part of the headdress represents the body of the bird and the two side parts the wings. This was corroborated by data from an ancient catalogue (Nuttall1904a, 6). When New Spain was conquered, many items, in gold, silver, jade, amber and other products, including some feather pieces, were sent to Spain. The entry in the catalogue says that an item of quetzal feathers, that the conquerors mistook for a skirt, was equipped with a gold beak that later disappeared. This demonstrates that the higher center part of the quetzal headdress with its long feathers was meant to represent the body of the bird. The beak, cast in gold and fixed to the lower center section, was part of the head meant to fall

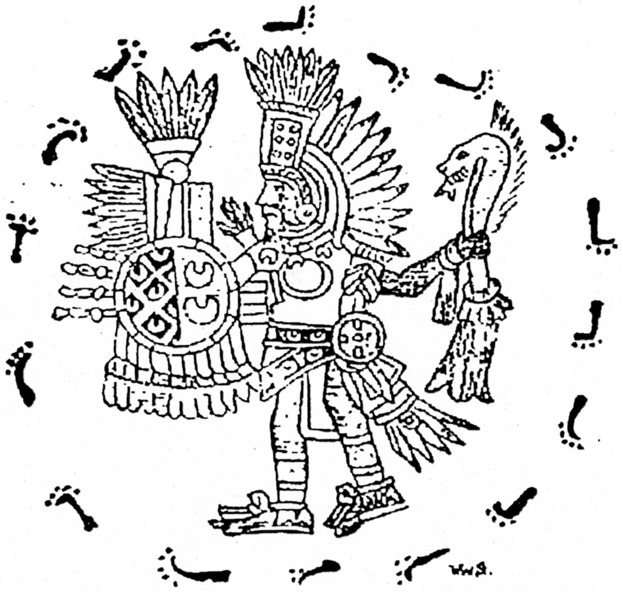

Figure 24.12. Quetzalcoatl as a warrior. Códice Magliabechiano, (1902, 77).

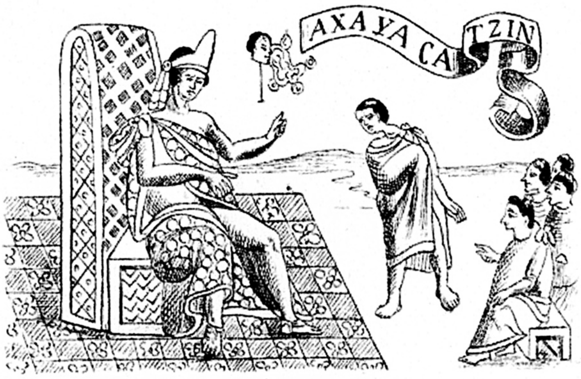

Figure 24.13. Axayacatl. Lord of Tenochtitlan wearing the xiuhuitzolli. (after Durán 1967, Atlas, illustr. 1).

onto the forehead of the wearer. The fan of feathers on the side was one of the two wings of the quetzal.

The Meaning of the Quetzalapanecáyotl

At one point in Mesoamerican history, the quetzal was transformed into the powerful god Quetzalcóatl, a merger of the quetzal bird and the rattlesnake. The quetzal-serpent probably represented heaven and earth. The bird, since it flies, represented the sky, while the snake, because it slithers, represented the earth.

The primary meaning of the quetzal feathers as seen in the priest at Teotihuacán (Fig. 24.9) is fertility because ancient Mexicans noticed the similarity in form and color of the quetzal feathers and the green leaves of the maize plant (Aguilera 1981). By the Postclassic, the *quetzalapanecáyotl* headdress had emerged as the symbol of rulership.

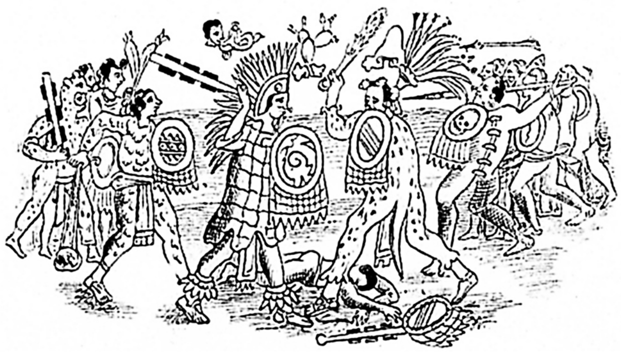

Figure 24.14. Axayacatl, Lord of Tenochtitlan. wearing the quetzalapanecayotl (after Durán 1967, Atlas, Illustr. 1).

The rulers were disguised or converted into quetzal birds when they wore these feathers to become the supreme power, although the headdress had a more specific meaning as well. The footprints around the quetzal, as seen in the bird at Teotihuacán and other quetzal birds in the same place, hold shields and arrows, so the quetzal bird can also represent war. The same is true of the quetzal god, Quetzalcóatl. In *Codex Magliabechiano* (Aguilera 1983: 77), (Fig. 24.12) this god is shown wearing the *quetzalapanecáyotl* and dressed as a warrior. He holds a shield, arrows, and a banner, and he is surrounded by footprints.

This same meaning is also found in two illustrations in Durán´s *Historia* In the first image, the Mexica ruler Axayácatl, whose name means "Face-water", wears the *xiuhuitzolli* or turquoise diadem on his head (Duran, 1967, *Atlas*, Vol. 3: Lam. 11), (Fig. 24.13). In the second image, this same ruler is shown fighting and wearing the *quetzalapanecáyotl (*Durán, 1967, Vol. *Atlas*: Lám.11), (Fig. 24.14). However, here the higher central part of the headdress is not shown because the picture was already quite westernized in style.

Conclusions

The only *quetzalapanecáyotl* in existence today is now held at the Ethnographic Museum in Vienna, Austria. Since it could not be recovered by Mexico, in 1964, on the occasion of the inauguration of the New National Museum of Anthropology, a quetzal feather headdress was carefully reconstructed and now has special pride of place in the Mexica or Aztec Hall (Fig. 24.15) (photo in Aguilera, 2003, 76). The quetzal tail feathers were carefully collected along with the smaller feathers of the *xiuhtototl*, a beautiful small blue bird. Today, the quetzal bird is in grave danger of extinction and the blue bird, apparently, has already disappeared.

Acknowledgements

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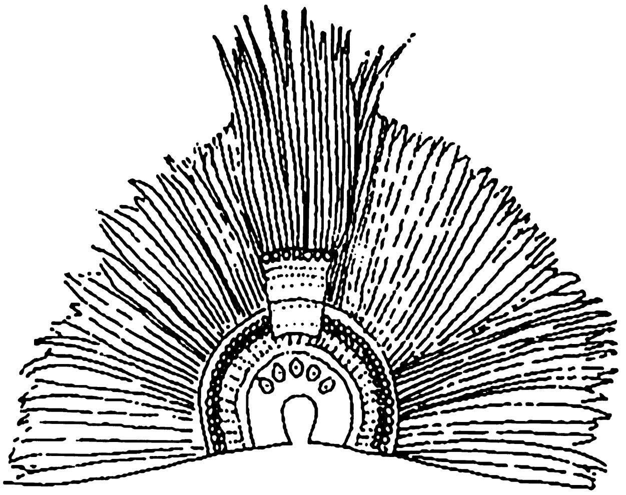

Figure 24.15. Reproduction of the quetzal Headdress. Sala Mexica. Museo de Antropologia.

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25. Pets in Pots: Superstitious Belief in a Medieval Christian (12th–14th Century) Village in Hungary

Márta Daróczi-Szabó

Numerous medieval sites in Hungary have yielded the remains of sacrificial animals placed in pots. The village of Kána is special in this respect. Due to the extensive excavation of this village, an unusually large number of these finds illustrate the survival of this pagan custom in a Christian context. The custom, which appears to be a construction sacrifice, seems to have survived for centuries in the Carpathian Basin. Ethnographic parallels have been documented until the early 20th century.

Keywords: sacrificial animals, construction sacrifice, Christianity, paganism, pike (*Esox lucius*)

Introduction

The first Hungarian king, Saint Stephan, ruled between 1000 and 1038. He strictly regulated Christian religious practice, banning pagan traditions. In spite of his orders, evidence of pagan rituals has been found at several archaeological sites. Many of these offerings included animals whose symbolic meaning often differs from their everyday roles. These animals are transformed into sacral objects of sacral activity through their sacrifice, acting as intermediaries between humans and supernatural forces. This paper is a review of a settlement at Kána where several sacrificial animal deposits have been recovered.

The medieval village of Kána was brought to light during rescue excavations carried out by archaeologists at the Budapest History Museum, preceding the construction of a suburban housing project in the outskirts of Budapest (Fig. 25.1). Excavations at this site took place between September 2003 and August 2005. The finds show that this area was inhabited during the Neolithic as well as the Copper, Bronze and Iron Ages. It was also occupied during the Avar and Early Medieval Periods. The archaeological site is 25 ha in size, of which 16 ha were occupied by the 12th- to early 14th-century village dated to the period of the Arpad Dynasty.

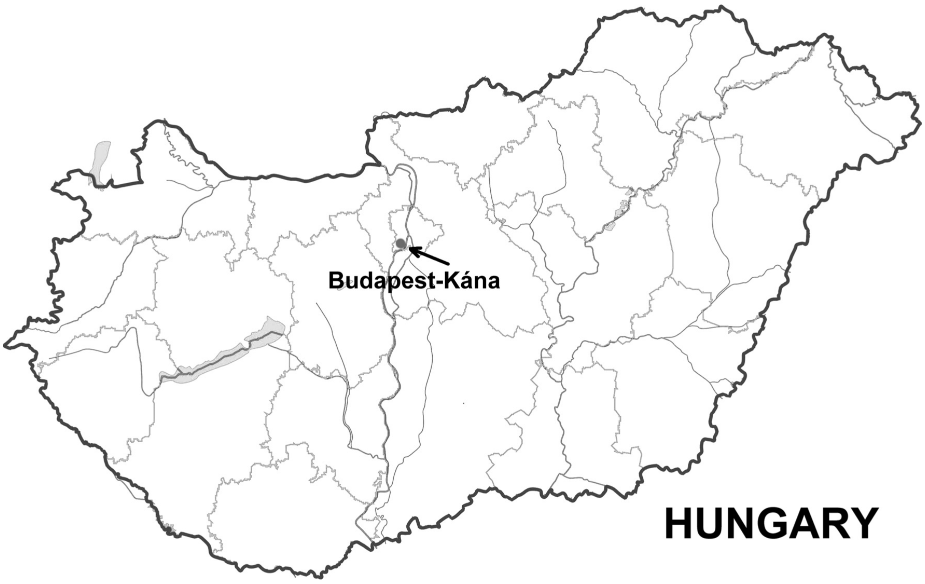

Figure 25.1. Map showing the location of the site.

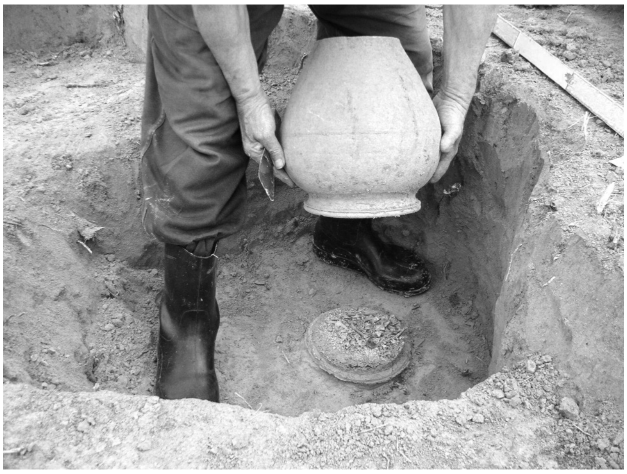

Figure 25.2. Pot from pit number 940.

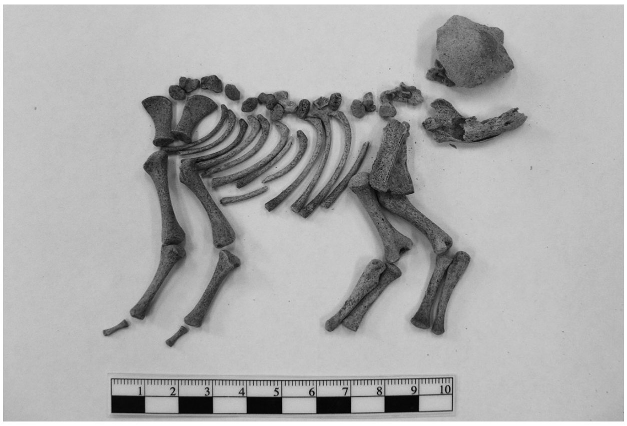

Figure 25.4. Puppy in pot from pit number 3054.

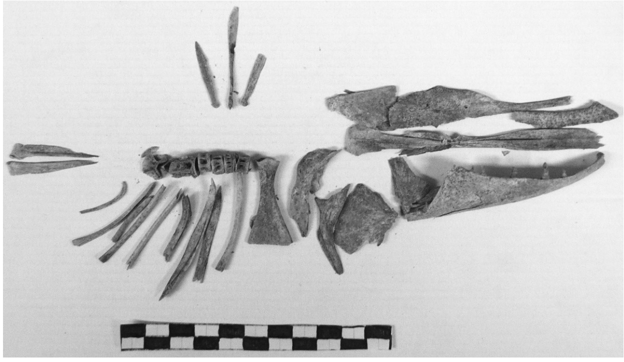

Figure 25.3. Pike found within pot from pit number 3054.

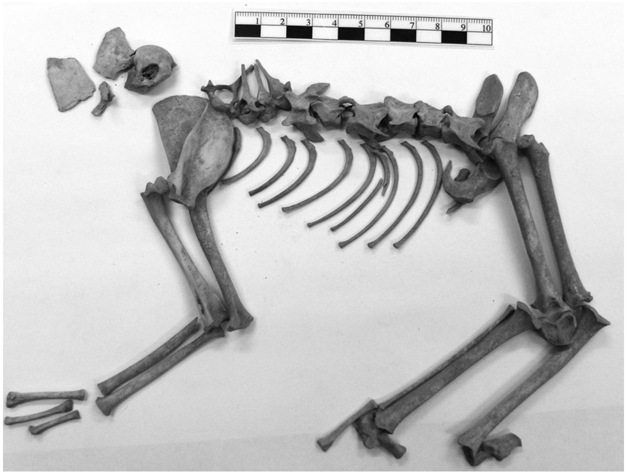

Figure 25.5. Cat in the pot from pit number 940.

The significance of the Arpad Period site of Kana is that excavations brought to light a very great part of, although not all, the medieval settlement. In addition to medieval dwellings and out-buildings, the remains of a church, surrounded by a cemetery of 1084 graves, were also excavated. Interestingly, the artifactual material is remarkably rich, considering that one is dealing with a rural settlement. Several valuable iron tools were recovered, in addition to shards of fine glass and coins. In addition, 40% of the graves were lined with carefully carved stone.

The area was not completely unknown to archaeologists since investigations had already been carried out in this region; between 1981 and 1989 Katalin H. Gyürki excavated the ruins of the nearby Kána Abbey. Although she had no resources to investigate the adjacent village, she identified the area where it was eventually found. The great number of burials lined with carved stone within the abbey may have served as a model for local villagers in designing their own graves.

As noted above, the village of Kána existed between the 12th- to early 14th-centuries. Since archaeologists could locate no destruction layers, it has been hypothesized that the village became depopulated as its inhabitants gradually moved to the nearby newly established city of Buda.

Animal bones from the site

The entire animal bone assemblage from this site is being analyzed by the author within the framework of her Ph.D. thesis. To date, 33,250 bones have been recorded from all periods with around 19,000 medieval bones already analyzed. The species ratios are not markedly different from those known from smaller sites. The majority of identifiable specimens originate from cattle (50%), followed by small domestic ruminants, sheep and goat (12%) and pig (10%). A relatively large number of bones originate from animals that were supposedly not used for meat – dog (12%) and horse (9%). The proportion of these species tends to be relatively high in faunal assemblages from other Arpad Period sites as well. A few bones from domestic ass were also recovered. These are not unique finds, but certainly rare during this period. The contribution of bones from domestic fowl was 3%, while only 1% of the identifiable bone specimens originated from domestic cat, and 1% from wild animals.

Special finds

Twenty-two pots, turned upside-down, came to light during the course of excavations in Kána village (Figs. 25.2–25.5).

	House	**Storage room**	**In the proximity of an oven**	**Ditch**	**Pit**	**?***	**Total**
With animal remains	4	1	1	1	6	1	**14**
Without animal remains	2				6	1	**9**
Total	**6**	**1**	**1**	**1**	**12**	**2**	**23**

* Original documentation lost, no reliable information is available.

Table 25.1. The distribution of upside-down pots by contents and location.

Identifiable specimens	**The completeness of the skeleton**	**Age**	**Number of Vessels containing this type of find**
Dog	Complete skeleton	newborn	3
Dog	Few bones	newborn	1
Cat	Complete skeleton	juvenile	1
Hen	Complete skeleton	adult	1
Hen	Bones of the wings and legs	juvenile	1
Hen	Fragment of tarsometatarsus	adult	1
Hen	Phalanges	?	1
Egg	Shell fragments		1
Pike	Complete skeleton	3 years old	1
Pike	Complete skeleton	?	1
Pike	A few bones	?	1
Pike	A few bones	?	1
Fish	A few bones	*?*	*4*
Bird(hen?)	A few bones	*?*	*3*
Egg	*Shell fragments*		3
Fragile lizard	*Three back scales*		*1*
Common hamster	*One tooth*	*senile*	*1*
Frog	A few bones	*?*	*1*
Frog	*One bone*	*?*	*2*
Total			**29***

*The reason the species number is higher than the number of vessels is that one of the vessels contained the remains of more than one species. Words in italics indicate identifications by Zsófia Kovács,

Table 25.2. Animal remains found in pots at Kána.

A complete mug found sitting in the normal, upright position in the posthole of a storage area, covered by a stone slab can be added as the 23rd in this series, because it contains bones as well.

Animal remains (including eggs) were found underneath fourteen of the upside-down urns. The classifications of these vessels by content and location are shown in Tables 25.1 and 25.2 respectively.

No animal bones were found in the remainder of the vessels. This may be explained in a variety of ways. One explanation is that they contained other types of animal remains (*e.g.*, blood or hair) that disintegrated over the centuries. On the other hand, it is also possible that smaller, poorly preserved bones, such as skeletal elements from fish, were not noticed by excavators when the first of these special vessels was discovered.

The presence of these pots is not a unique phenomemon since they have been found at several other medieval sites. However, no other settlement has yielded such great numbers of these sacrificial finds. This is also indubitably a matter of sample size, as Kána is the first medieval village to have almost completely excavated in Hungary.

During the course of the excavations, the archaeologists collected a number of soil samples for macrobotanical and microfaunal analyses. The microfauna are being analyzed by Zsófia Kovács (Kovács 2006). Some of the soil samples contained earth from the vessels that were upside-down, and animal bones were recovered from flotation samples from five of the vessels. In fact, the animal sacrifices in two of the vessels were only identified during the microfaunal analyses. Kovács has kindly shared her unpublished results.

Some of animals found in these contexts were young individuals; all four puppies (Fig. 25.4) were newborn, and even the cat was only a juvenile (Fig. 25.5). Ageing the skeletons of fowl is more difficult since the bones of birds tend to ossify at relatively younger ages than those of mammals. The lack of epiphyseal fusion, however, was apparent on the skeleton of a young hen, showing the tender age of this animal. One of the eggs does not fit the general pattern in any sense. It was found together with an iron knife and a bronze needle.

It is not clear whether the remains of the hamster, lizard, and frog were actually placed deliberately in the vessels. The hamster, in particular, it is likely to be a recent animal. Hamsters frequently burrow deep down into archaeological layers, while the amphibians probably burrowed down into the looser cultural layers during the winter.

As noted above, similar sacrificial pots have been found at a number of archaeological sites (villages, religious sites and features not linked specifically to settlements). As may be seen in Table 25.3, the most common zoological finds came from hens, roosters and sometimes dogs. Egg finds also occurred (Gyürky 1967; Sági 1967; Horváth 1969; Horváth 1979a; Horváth 1979b; Lovag 1985; Fodor 1986; Hellebrandt 1989; Vörös 1990; Vörös 1991; Takács 1993;

	Village	Church or monastery	Feature not specified	Total
Rooster	1	1		
Hen	8	3	2	
Egg	8	1	4	
Dog	3			
Sparrow	1			
Unidentified animal bones	2		1	
Total	23	5	7	**35**

Table 25.3. Animal remains found under pots at 19 additional medieval sites.

Wolf 1993; Pölös 2001, Tomka 2007, Gál in press, Péter Gróf and Tamás Pusztai personal communication).

It is also clear from this table that the skeletons of neither cats nor fish are known from similar sacrificial contexts at other sites. It is not clear, however, whether this reflects a conscious decision or whether the species of the sacrificial animal actually made no difference.

In all probability, the vessels containing animal remains served as construction sacrifices. This seems most unambiguous in the case of finds recovered from houses. When such finds are found in pits, one may speculate whether the pits themselves had belonged to particular buildings or constructions, the remains of which were destroyed by modern tillage or other, natural diagenetic agents. The vessel found in a ditch is not only interesting owing to its location; it also stands out as the only pot that, in addition to a zoological find (egg), also contained metal objects. Metal artifacts, especially knives, sometimes played an apotropaic role in ancient belief systems (Ortutay, 1982, 495; Pölös 2001). Moreover, the location of this unique find in a ditch is further evidence that it is more than a common "construction sacrifice".

As is shown by examples found at other sites (Sági 1967, Horvát 1979a, Régészeti Füzetek 1985, Wolf 1993, Pölös 2001) iron nails sometimes also accompanied the hen skeletons and eggs. These finds of iron were possibly aimed at reinforcing the apotropaic power of the sacrifice.

I have also tried to explore this topic through the documentation of witch trials in early post-medieval sources. Although this effort has yielded some results, these parallels could not be used to directly interpret medieval construction sacrifices. Although a formal parallel was found in the written record (placing animals into pots and burying them), the aims of that practice was seduction rather than a construction sacrifice. Moreover, the "sacrificial" animal in the trial documents was a frog (Bogáts no date, Bessenyei (1997, 40; Bessenyei no date, 269; G. Tóth 2005, 176, G. Tóth in press). Although three of the upside-down vessels from Kána contained frog bones, those probably ended up there by natural means. If they had represented real animal sacrifices then the entire skeleton would have been found during flotation, not just single bones. There are no examples from anywhere in the territory of medieval Hungary from similar contexts where frog remains were found in such vessels.

As was mentioned previously, the custom of construction sacrifices survived until the 20th century. (Dömötör (ed.) 1990, 562–3; Pölös 2001) According to the definition of construction sacrifice in the "Ethnographic Lexicon" (Pócs 1990):

> …It was a nationwide belief that a new building demanded sacrifice. Therefore it was common that the first night in a new house was spent by someone whose life was worth little... it was also customary to lock dogs, cats or chickens inside the new buildings. Sometimes animals were slaughtered as people moved in: a chicken's throat was slit, or a dog was beaten to death on the doorstep. Hens, cats or animal products such as eggs were also sometimes incorporated in the walls of new constructions.

This quote is also important because the species mentioned all appear in the upside down vessels in the Kána assemblage.

Although this is not directly related to the topic defined in the title of this article, horse skulls found within the territory of medieval Kána are also worth mentioning. A complete horse skull was found in a pit, while the remains of another horse head came to light in an ash pit. Horse skulls are known from a number of Árpád Period and even later medieval settlements in Hungary. There is a consensus among archaeologists that most of these must have been displayed to ward off evil. This custom is known from a number of geographical regions with ethnographic parallels surviving well into the 20th century (Méri 1964, Bökönyi 1981, Takács 1990, 1996). The custom has actually been observed throughout Eurasia (Bökönyi 1978, Bartosiewicz 1995). In the case of the Kána finds, the position of these skulls in pits may be considered secondary.

As mentioned before, adopting Christianity meant that practicing earlier pagan rituals was banned by law. Maybe the proximity of the church and abbey limited the possibility of displaying horse skulls in a village so closely associated with them. This theory, however, is contradicted by the fact that vessels containing similar animal remains, interpretable as construction sacrifices, have also been found within the territories of churches and monasteries, *e.g.* at Saint Peter's Church in Buda and Peter's Church in Székesfehérvár (Bartha 1984).

Summary

These ritual finds deserve attention from several points of view. On the one hand, they have never been found in such large numbers from a single site. Naturally, this could be related to the fact that so much of Kána was excavated.

On the other hand, the finds listed here are also interesting, because in addition to the ”usual” species found under such circumstances (domestic hen and sometimes dog) the remains of cat and, especially, pike were also recovered. While cat has at least been mentioned in the ethnographic literature, there is no trace of pike in the written sources and beliefs related to this fish are similarly unknown. An additional, important aspect of these pagan rituals is that they seem to have flourished in spite of centuries of ideological dominance by Christianity. The animals whose remains were found in such vessels were elevated above their mundane meanings and transformed into a kind of intermediary between the profane and spiritual worlds of the medieval inhabitants of Kána village.

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26. "Left" is "Right": The Symbolism behind Side Choice among Ancient Animal Sacrifices

Michael MacKinnon

Many cultures, both past and present, have assigned side choices to animal parts offered in sacrifice. Often the implied connection is that the right side represents the godly, pure, or heavenly component, while the left side is generally associated with opposing qualities: mortal, impure, or sinister. This paper examines side choice among sacrificial animal victims in ancient Greek and Roman contexts, offering some parallels with such practices among other cultures – prehistoric, ancient, and modern. Typically when a side is chosen (and recorded zooarchaeologically), the right predominates among most contexts, as attested by sacrifice to the Greek god Apollo at both the sites of Kourion (Davis 1996) and Halieis (Jameson 1988). Other archaeological contexts where right-sided elements predominate include Ouessant Island, France (Méniel 2001) and Great Chesterford, England (Legge et al. *1991; Baxter, in press). An important exception, however, does exist. Zooarchaeological data from Archaic period deposits (6th–5th centuries BC) at the site of Ancient Nemea in Greece, indicate a predilection for sheep as the standard sacrificial animal, but show a definite preference for the hind limb sections of the left side in the case of offerings to the chthonic hero Opheltes, as opposed to the Olympian god Zeus. The situation for the choice of left and right sides among ancient Old and New World archaeological animal offerings is examined in light of ancient textual, mythological and philosophical directives, as well as modern ethnographic evidence documenting the protocol for sacrifices to gods, heroes, and mortals.*

Keywords: Greek and Roman, Mayan, animal sacrifice, left side-right side, philosophy, ethnography

Introduction

The notion of "transforming" something generally entails some measure of change, be this in appearance, in character, in meaning, or in some other capacity. Animals and their bones certainly go through such changes or transformations. At one level, they can change in appearance, through methods of butchery, bone working, taphonomy, and so forth. However, as objects used and modified by humans, animals and their bones are also imbued with cultural meanings – meanings that, in turn, can change or transform as dictated by the shifting needs of the cultural groups creating them. It is this transformation of meaning that forms the focus of this study, specifically, the significance of side choice in animal sacrifice. If a particular side is chosen to offer in some ritual context, which is it, left or right, and why is that the case? Zooarchaeological examples from ancient Greek and Roman ritual contexts form the basis of analysis, with cases for right side and left side sections of animals explored. Classical archaeology offers a rich database of sacrificial assemblages with animal bones, which can be addressed within the context of ancient philosophical, literary, and iconographical directives about the significance of right and left sides in ancient life. Supplementary zooarchaeological data drawn from other archaeological cultures, including the ancient Maya, will also be included to help delineate larger cultural universals in attempting to explain side choice in animal sacrifice. Overall, there are few ritual cases from past cultures where a side preference is marked in the zooarchaeological record. Where this is the case, however, the right side appears to dominate. The implication among ancient Greek and Roman religious rituals is that this signifies a sacrifice to a righteous, generally heavenly (*cf.* Olympian, in the case of ancient Greek religion) deity. Left side preferences are quite rare among ancient contexts. The assumption here is that this side represents sacrifices to an underworld deity, or at least one with contrasting qualities to any heavenly counterpart.

Biology and Philosophy of Left and Right

Biologically, humans are predominantly a right-handed species, about 90% of us, that is (Palka 2002, 426). The physical explanation for this phenomenon generally hinges on debates about lateralization in our brains. The greater development of the left cerebral hemisphere, which largely harbors the centers for articulate speech and voluntary movements, predisposes human right hand dominance, since the left side of the brain innervates the muscles on the right side of the body (Hertz 1960, 90). Avoiding all arguments about which came first, handedness or brain lateralization, the fact remains that there is a biological pre-eminence of our right hand. Right hand biological dominance, however, has also led to social and religious constructs favoring the right side among most cultures. In essence then, a biological disposition for handedness has been transformed into a social duality where right equals good, pure, important, or other such favorable traits, leaving the left side as the opposite.

According to some anthropologists (notably, structuralists, such as Lévi-Strauss, among others), the dualism in right versus left side stems from binary thinking in the way humans organize their world. We structure things by opposites: light and dark, day and night, sky and earth, high and low, sacred and profane, male and female, *etc*. This dualism exerts a strong influence on many aspects of our culture to the point where left and right convey a symbolic significance beyond the mere reference to sidedness. Thus, humans have socially transformed the meaning of right and left for their purposes, and the dyad shapes aspects of behavior, cosmology, and social, spatial, and ideological symbolism, expression and representation in human societies (see, Boas 1955; Hertz 1960; 1973; Lévi-Strauss 1963, Needham 1973; Palka 2002; Van Zantwijk *et al.* 1990; among others). Generally, the right side is associated with the more positive attributes – light, good, heaven, and male – while the left side denotes the opposite – dark, evil, underworld, and female. Similar and often extended associations are to be found in many modern cultures, including the Polynesians, various African tribes, and Arabs, but also among past groups, such as the ancient Greeks, Romans, and Mayans (Needham 1973; Palka 2002). Chinese culture is somewhat exceptional in assigning the left side a more honorable state, even though the Chinese themselves are predominantly right-handed (Corballis and Beale 1976, 192).

While there has been much anthropological discussion and scholarship analyzing structural and psychological theories about binary dualism, including the right/left divide, far less attention has focused on the expression of such aspects in material culture represented by archaeological remains. Within this realm, however, studies tend to be dominated by aspects of left and right symbolism in past cultures, such as ancient Mayan iconography (Palka 2002) or ancient Greek and Roman literature and philosophy (Lloyd 1962). Comparably less work, however, has concentrated on other material traces of choice between left and right parameters in past societies.

Since all animals have left and right sides, zooarchaeologists are in a good position to examine side choice from animal bone assemblages, provided this information is available. Herein lies the first hurdle. Side is not always noted during analyses, even if it is relatively easy to deduce for most elements. More efforts have focused on biases in species and/or skeletal parts representation and the relationship of these to issues such as taphonomy or cultural practices like victim choice, butchery, and resource provisioning. Assumptions are normally made that more deliberate cultural choices go into picking the victim and/or skeletal part, with less attention devoted to choice of left or right sides, especially if whole carcasses are brought to the butcher. Presumably, either side carries equal importance if the cultural focus is strictly upon the animal as a meat-producing, symmetrical organism. However, if a greater emphasis is placed on the symbolic nature of right and left as good and bad, respectively, deliberate side selection may transpire. Such is the case concerning ritual and sacrifice – topics where understanding symbolism is critical.

Zooarchaeological Examples: Right Side Preference

Given the strong cultural predominance for right-handedness, and the positive connotations this side implies, it is no wonder that available zooarchaeological evidence for a side preference favor the right. Greek and Roman samples provide some of the best cases of this practice. Antitheses or oppositions were at the core of ancient Greek religion and philosophy (*e.g.,* Pythagorean Table of Opposites), practices that in turn were copied in great part by the ancient Romans. Right is lucky and left unlucky for the Greeks (Lloyd 1962). The extension of these traits to other fundamental opposites, such as Olympian and underworld deities, gods and mortals, sacred and profane, good and evil, light and dark, white and black, *etc*., was a natural connection for the ancient Greeks and Romans. Ancient texts and iconography reference cases where white animals are sacrificed to Olympian deities and black animals to underworld gods (see Lloyd 1962 and Kadletz 1976 for examples). Cases of sacrificing either a male or female animal to a respective male or female deity are also common in ancient Greek and Roman religion (Kadletz 1976). While animal sex might not be as readily noticeable to an untrained audience, color distinction would certainly be a much clearer visible marker or symbol to all in attendance at the sacrifice – a black or white cow, for example. Unfortunately, hide color is currently untraceable from animal bone remains, so this method cannot be tested zooarchaeologically, even if this was a principal form to denote heavenly versus underworld victims. Nevertheless, as DNA analyses advance in zooarchaeological research, it may soon be possible to determine hide colors by recognizing specific genetic sequences in DNA extracted from archaeological animal bones (Linderholm *et al.* 2006). Another method to achieve a distinction in animal choice, however, is by picking a side – right for heavenly gods or Olympians, left for underworld – although such a distinction might not be as swiftly apparent to public

god	Site	Date cent.	NISP	Sacrifice	Reference
Zeus	Paestum	3rd BCE		90% cattle, 3% sheep/goat, 3% pig, 4% horse	Leguilloux 1999
Hera	Samos	7th BCE		65% cattle, 25% sheep/goat, 10% pig – sheep predominate	Boessneck and von den Driesch 1988
Poseidon	Tenos	3rd to 2nd BCE	278	63% cattle, 24% pig, 13% sheep/goat	Leguilloux 1999
	Isthmia	Iron Age & Archaic	9770	c. 52% cattle, c. 48% sheep/goat – predominance of upper hind limb	Gebhard and Reese 2005
Athena	Tegea	Geometric	2316	68% sheep/goat, 22% cattle, 10% pig	Vila 2000
Apollo	Kourion	Late 8th to 6th BCE	588	97% s/g, 2% cattle, trace pig, donkey & fox – right side preference – tibiae, astragali & calcanei	Davis 1996
	Halieis	5th BCE		41 goat horn cores (adults), infantile s/g (tibiae, metatarsals, pelves – primarily right side), tibiae of young pigs	Jameson 1988
Artemis	Ephesos	7th to 4th BCE	755	56% sheep/goat, 30% cattle, 10% pig – goats predominate; wild animals also noted	Brein and Wolff 1978; Bammer 1998
Apollo/ Artemis	Kalapodi	3rd BCE		44% sheep/goat, 22% cattle, 21% pig	Stanzel 1991
Aphrodite	Athens (Agora)	5th to 4th BCE	approx. 3200	99.7% sheep/goat, 0.3% pig – vertebrae, femora, ribs, patellae & horncores	Foster 1984; Reese 1989; Hägg 1998
	Miletos	7th to 5th BCE	5538	90% sheep/goat, 9% cattle, 1% other – sheep predominate – chiefly sacra, caudal vertebrae & patellae	Peters and von den Driesch 1992; Peters 1993
	Tamassos	Archaic	305	56% sheep/goat, 19% cattle, 13% pig	Nobis 1978
	Amathonte	Archaic	1152	80% sheep/goat, 20% cattle	Columeau 1996
	Paestum	5th BCE		70% birds, 30% s/g	Toco Sciarelli 1988
Demeter/ Persephone	Corinth	4th BCE	164	56% pig, 29% fish, 7% sheep/goat, 9% others	Bookidis *et al.* 1999
	Mytilene	First part of 4th BCE	>5000 bones	87% sheep/goat, 13% others – further deposit with young s/g and piglets	Reese 1989; Ruscillo 1996
	Knossos	3rd to 2nd BCE	147	95% pig, 2.5% cattle, 2.5% sheep/goat	Jarman 1973
	Syracuse	2nd BCE	419	46.5% pig, 38% s/g, 10.5% cattle, 4.8% others	Villari 1989
	Cyrene, Libya	7th BCE	772	78% pig, 17% sheep/goat, 3% cattle; all ages represented but younger pigs likely sacrificed	Crabtree and Monge 1990

Table 26.1. Comparative data for animal sacrifice in Greek antiquity; Sacrifice to gods.

Hero	Site	Date cent.	NISP	Sacrifice	Reference
Herakles	Thasos	4th BCE	297	c. 75% sheep/goat, c. 25% cattle – all parts of skeleton represented and burnt (holocaust sacrifice?) – mix of lambs, juveniles, and adults	Des Courtilis, Gardeisen and Pariente 1996
Anios	Delos	Hellenistic	157	89% sheep/goat, 3% cattle, 8% pig	Prost 1997
Melikertes-Palaimon	Isthmia	1st to 3rd CE	28300	98% cattle, 2% sheep/goat – all parts represented – separate deposits for cattle and sheep/goat remains	Gebhard and Reese 2005
Opheltes	Nemea	6th to 4th BCE	159	85% sheep/goat, 8% cattle, 6% pig (ritually burnt) – preference for left hind limbs (pelves, tibiae) – near absence of ribs, vertebrae and distal leg elements	MacKinnon, this report

Table 26.2. Comparative data for animal sacrifice in Greek antiquity; Sacrifice to heroes.

Place	Site	Date	NISP	Sacrifice	Reference
Palace of Nestor	Pylos	Mycenaean	198	– predominantly cattle (burnt) – chiefly mandibles, humeri and femora	Isaakidou *et al*. 2001
Temple area	Asea, Agios Elias	Archaic		– burnt fragments of sheep/goat femora, patellae, caudal vertebrae and sacra – chiefly adults, but some infants or neonates	Vila 2000
Kabeirion	Thebes	Classical to Roman		– sheep and goats predominate, c. 20% cattle	Boessneck 1973
Palace complex	Kommos, Crete	1000 BCE to CE 150		– sheep (burnt and unburnt – principally hindquarters), pig (unburnt), cattle (complete)	Reese 1984

Table 26.3. Comparative data for animal sacrifice in Greek antiquity; Sacrifice to unknown figure (god, hero, or otherwise).

observers as might the victim's color, and for this reason might not be commonly practiced. Still, it might solidify the importance of the ritual, with the worshippers taking that extra step to distinguish and symbolize side choice in their sacrifices. Moreover, side choice can be examined from the zooarchaeological record.

Ideally, to test this hypothesis of side preference, clear and distinct samples of animal sacrifices to heavenly and underworld deities are required. This is challenging to observe in light of complications such as mixing of sacrificial remains, re-use of altars for various types of sacrifices, and the poor or unknown connections of sacrificial faunal debris with specific deities. Nevertheless, several good examples are known from ancient Greek and Roman contexts. Comparisons among these cases can help determine underlying patterns and processes in side selection.

Tables 26.1–26.3 collect a number of Greek and

Aegean sites with faunal remains from sacrificial contexts. Collectively, these sites span a period from about 1000 BC until around the 200 CE; the bulk, however, date from the 7th until the 2nd centuries BCE. The data are divided into three tables: (Table 26.1) sacrifices to Olympian gods; (Table 26.2) sacrifices to heroes; (Table 26.3) sacrifices where the particular honored individual is unknown. There are two immediate problems in testing side preference using these sites. First, even though side information was not always recorded in the faunal reports, the assumption is made that it would have been tabulated, at least on a cursory level by each zooarchaeologist, with at least some mention of side biases, if such biases existed, and especially if these patterns were clearly demarcated. Still, it is difficult to test this assumption without directly asking the zooarchaeologists themselves about their methodologies. An informal survey of those involved, however, shows that each would have recorded side biases in their reports had such a phenomenon been well marked. Consequently, it appears that the patterns examined are real, as opposed to being simply a matter of unrecorded data.

A second bias in reconstructing patterns of side choice from the data is that the available pool of sacrifices to known deities contains no underworld representatives. All are Olympian gods; thus, data only exist to test this "heavenly" half of the equation. Nevertheless, there is one sample from the site of Nemea, Greece, that helps fill this underworld gap. Even though the sacrifice here is not to an ancient Greek deity, *per se*, but rather a Greek hero, this particular hero has chthonic affiliations.

Within the Olympian sacrificial samples predicted patterns emerge, in general. As Lupu (2005, 56) explains:

> Special information for animal sacrifices is given in Greek sacred law to the extent that is religiously desirable; when it is not given, there is little reason to suppose that it is desirable. For example, if the type, age, sex, or colour of a victim is specified, it is important; otherwise we may assume that any victim can be offered or, possibly, that the identity of the victim is well known.

Consequently, ancient texts provide details about which animals, which ages, which sexes, *etc*., were sacrificed. Moreover, they often record under which circumstances, and to which deity or recipient these sacrifices took place. According to these accounts, divinities received a mix of animal victims, cattle, caprines, and pigs, often skewed towards the commonly preferred animal for each. Lists of ancient references for Greek and Roman animal sacrifices, with tallies for the number of times certain animal taxa are referenced elsewhere (*e.g.*, Kadletz 1976). Zooarchaeological data help confirm some of these patterns. Tables 26.1–26.3 summarize faunal data from sacrificial contexts at ancient sites in the Greek and the Aegean world. Several patterns are evident. Pigs, for example, dominate among faunal assemblages associated with sacrifice to Demeter; sheep outnumber other victims in the cults of Aphrodite; some wild animals are noted among sacrifices for Artemis; cows comprise 65% of the offerings to Hera, in her cult at Samos (Greece). Patterns also emerge when considering skeletal parts. Some deposits, such as the Herakles samples from Thasos (Greece), were *holocaust* sacrifices, where the whole carcass was burnt on the altar, while others contain only parts of the carcasses. Examples of the latter include the cult of Poseidon at Isthmia (Greece), where upper hind limbs of cattle and caprines are represented, or sacrifice to Aphrodite at the site of Miletos (Turkey), where vertebrae and lower leg bones of sheep are noted. There has been much debate about the skeletal parts offered to Greek deities (Burkert 1985; Durand 1986; Jameson 1988; Detienne and Vernant 1989; Van Straten 1995; Ekroth 1999), and some confirmation, zooarchaeologically, that gods were offered select portions, including: (1) hind leg bones (whether whole or stripped of meat and wrapped in fat is difficult to tell); (2) tail sections (through the presence of caudal vertebrae in faunal assemblages); (3) whole victims, presumably in a type of *holocaust* sacrifice that is, depending on the context.

Two sites in the aforementioned list of Greek sacrificial assemblages to deities noted a side preference. In both cases, Apollo is the god in question, and the right side was chosen. As shown in Table 26.1, young sheep and goats comprise 97% of the sample in the cult of the god Apollo at Kourion (Cyprus), with a strong preference for the right side elements, chiefly the tibiae, astragali, and calcanei in this sacrificial assemblage (Davis 1996). A similar predominance of right hind leg elements from younger caprines is noted in the sample from Halieis (Greece) also linked with Apollo. The assemblages here both are ritually burnt, confirming their association with cult sacrifice to Apollo.

Connecting the preference for right-sided lower leg elements of sheep with sacrifices to an Olympian deity seems logical. Right side equals positive qualities: heavenly, good, sacred, and so forth. Why this practice appears exclusively with Apollo and no other Olympian deity is unclear. The correlation of Apollo with the sun may play some role, as this was the ultimate source of light up in the sky. Perhaps, in this capacity, Apollo stands for doubly righteous qualities – both male and the sun. This could be contrasted with his female twin sister, Artemis, who is associated with the moon (although she too is a "heavenly" Olympian deity and not an exclusively underworld goddess). Consequently, Apollo's cult may have sought to distinguish his sacrifices in a manner different from most other ancient Greek deities.

Priests and cult worshippers often consumed sacrificial meat during Greek rituals. Deciding who gets what was complicated. According to some scholars of Greek law, "should right legs be distinguished from left legs, they usually go to the priest; left legs may go to divinities (though they may have to settle for the bones alone)" (Lupu 2005, 222, note 6). I am not convinced that this is the case – at least based on zooarchaeological evidence this does not seem correct. If the right side was the priestly side and the left a subordinate section for the gods, then it is possible

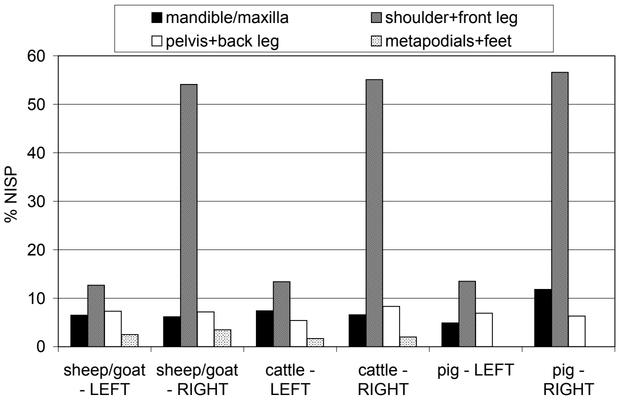

Figure 26.1. Ouessant Island: Proportions of left and right side elements for skeletal part categories for sheep/goat (NISP=3615), cattle (NISP=1750) and pig (NISP=288).

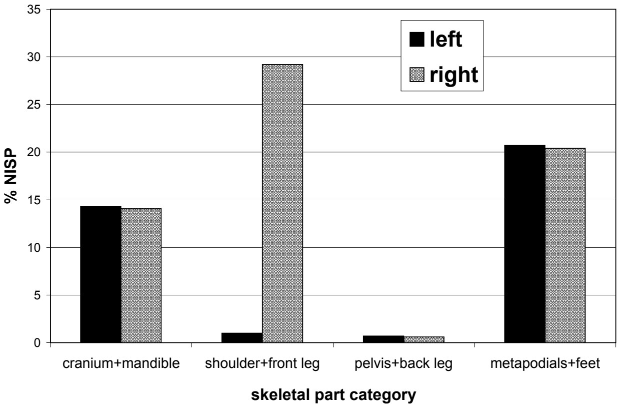

Figure 26.2. Great Chesterford: NISP frequency of sheep/ goat elements by skeletal part category (NISP=10,276 for sheep/goat sample).

that the choice of right side elements to Apollo denotes not the godly portion, but the priest portion, stripped of meat and subsequently offered to this divinity.

Although evidence for right-side preference among other Old World zooarchaeological assemblages from ancient sites is limited, there are still more cases for this side choice than the left side. Examples, moreover, are disparate, both geographically and temporally. Simon Davis (1987, 249–51) recorded a side bias for caprine (and in particular lamb and kid) remains from ritual deposits at the Iron Age site at Tel Qiri, a small agricultural settlement in the Jezreel Valley, Israel. Here, right-sided elements outnumbered left ones by a ratio of over 12 to 1 (196 right: 16 left).

No cases of animal bone side preference among ancient sites in North Africa (except dynastic Egypt: Bartosiewicz 2000), Italy, Spain, or Portugal have been published – although as mentioned before, side choice was not always reported in the zooarchaeological literature consulted. Granted, the available pool of material may be small to begin with, given that only a handful of zooarchaeological assemblages at many of the sites in these areas can be classified as uncontaminated ritual assemblages. Still, available data suggest no clear separation of sacrificial parts for these western Mediterranean, non-Greek sites. It would seem that most received whole animals, as was common in Roman sacrifices, such as the *suovetaurilia* – the sacrifice of cattle, sheep, and pig. Similarly to the Greek practices, meat offerings might be shared between gods and people in a Roman sacrificial feast, or the food might be given entirely to the gods by burning it all.

One case from France warrants closer analysis. Excavations on Ouessant Island, located off the northwest coast of France, produced a series of structures and large deposits with animal bone waste. The project's zooarchaeologist, Patrice Méniel, recorded a distinct predominance of right shoulder elements of cattle, caprines, and pigs from these deposits (Le Bihan and Méniel 2002). Side choice frequencies are depicted in Figure 26.1. Méniel noted that the phenomenon was observed in all three domestic species (*i.e.*, cattle, sheep/goat, and pig) throughout the main phases of occupation at the site (that is, from the Middle Bronze Age to the Roman period), amplifying over time, and with a greater discrepancy of right side selection in the later phases. The long tradition for right side choice at Ouessant hints at very early roots to this phenomenon; it is not simply a factor in ancient Greek philosophy only, but may have cultural antecedents in areas farther removed from this region as well. Why this is the case, however, is difficult to determine. Unlike the Greek ritual samples mentioned earlier, the materials from Ouessant Island were not burnt, so their connection, at least to burnt sacrifice, is unknown. Moreover, the phenomenon is restricted to shoulder and fore-limb elements, chiefly the scapula, humerus, radius, and ulna; a greater balance between sides is noted for the remaining skeletal elements. Clearly there is cultural selection here, either deliberate removal of the left shoulder elements to somewhere else (leaving the right behind), or the reverse, that is, deliberate selection for the right shoulder bones for these deposits. The excavators postulate some ritual connection, perhaps a sacred feast or banquet, wherein right shoulder elements carried some symbolic importance, presumably as heavenly representatives. In the absence of the "missing" left side shoulder pieces from other areas at the site, and without clear ritual associations for these deposits, however, this correlation is difficult to confirm.

A similar pattern of right shoulder element predominance characterizes "ritual" assemblages from the Roman-British temple site at Great Chesterford, in Essex, England. According to Ian Baxter, the project's zooarchaeologist, the main "ritual" assemblages here consisted of over 26,000 sheep bones in two main pits (Baxter, in press). As shown in this Figure 26.2, Baxter records a significant abundance of elements from the right shoulder and front legs of sheep, and a simultaneous dearth of these for the left side. Right and left sides are fairly equally represented for the remaining skeletal categories such as the head, feet, and hind limb; however, it is important to note that bones from the pelvis and back leg are distinctly under-represented compared to their front limb shoulder equivalents. Certainly this artificial selection of body parts has definite cultural, and specifically ritual, significance and typifies the votive assemblage at this site. Although some of this material is burnt, Baxter (in press) notes that the burnt fragments recovered from the pits do not have the appearance of parts that would have been offered up as burnt sacrifices. They represent all parts of the skeleton in similar fashion to the un-burnt assemblage. In general, these pits contain what would have been left over from the sacrifice and the removal of the meat, amounting to sacred rubbish requiring special disposal. Unfortunately, similar to the case of Ouessant Island, there is little indication in the material remains at Great Chesterford of the identity of the deity or deities to which the temple and ritual deposits were dedicated. Considering the monumentality and prominence of the temple, and the magnitude of the faunal deposits in association, one may assume that it was an important, presumably "heavenly," deity as opposed to a more subversive, underworld being.

Right-side faunal element prevalence is further noted among several other pre-Roman and Roman sites. The first of these is burnt material from a pre-Roman cistern in Pompeii, in the area of the Temple of Venus. Alison Carnell (personal communication) notes that the data here indicate "6 right distal tibiae, compared to one left (pig)" and that "there also seems to be a preference for front feet for pig: 12 front, compared to 4 hind." Moreover, she states that "there does not seem to be evidence of side preference for other species, in the same way as pigs." A second case occurs in the seasonal sacrifices made at the Romano-British Temple of Harlow, Essex, England, where "in every phase, the right-hand mandible of sheep/goat was between two to four times as common as the left side" (Legge and Dorrington 1985, 124). The fact that 92% of the 221 sheep/goat mandibles identified in the Harlow Temple deposits came from sub-adult animals may be interpreted as a spring lambing and an autumn sacrifice (Legge, Williams and Williams 2000, 153). Nevertheless, while intriguing, in both of these Roman cases, samples are either too small for clear comparisons, or the ratios between left and right sides are not significantly skewed to conclude that the phenomenon was determined by cultural norms. Still, the fact that in both of these cases right side elements predominate parallels data from the Kourion, Halieis, Ouessant Island, and Great Chesterford examples above. Cross-culturally among a variety of sites spread temporally and geographically in ancient Europe, at least, in those few cases where an animal's side has been chosen and recorded, right-sided elements are normally the item of choice. Whether this relates to a bias of sacrificial assemblages for "heavenly" figures is debatable, but seems a logical explanation in many of these instances.

Zooarchaeological Examples: Left Side Preference

While several zooarchaeological cases for right side selection have been reported, there are far fewer cases for the left side selection. It can be argued that there is only one site from ancient Greek and Roman archaeological contexts where this phenomenon is evidenced, the site of Ancient Nemea, Greece.

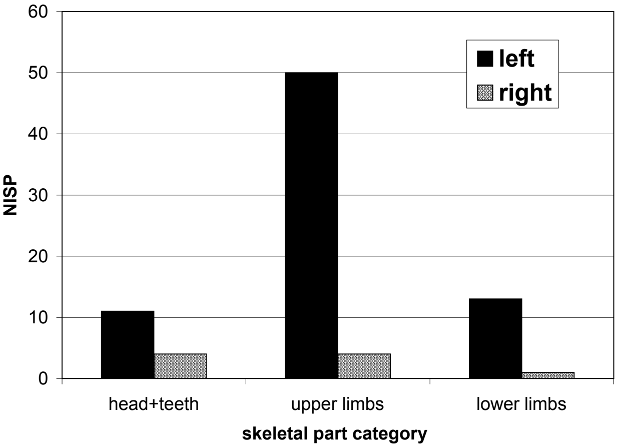

Figure 26.3. Heroon deposits at Nemea: NISP count of sheep/goat bones by skeletal part category (NISP=93).

The site of Ancient Nemea, located near Corinth, was the locus of the Nemean Games during Greek Antiquity. According to Greek legend, these games were instituted to honor the child hero Opheltes, who was strangled to death by a snake when his slave care-giver placed him on the ground to attend to the soldiers in the Seven against Thebes. Upon his death, Opheltes was given another name, Archemoros, meaning "beginning of doom." In this guise, therefore, he had underworld connections. Ophelte's shrine and altar have been excavated at Nemea, in two general series of campaigns (1979–1983 and 1997–2001). Charred faunal deposits within this sacred precinct (called the Heroon) are believed to relate to sacrifices to this hero figure. Their analysis yielded two very interesting results. First, among the fragments identified as belonging to sheep or goat, there is a marked preference for the upper part of the hind limb (*i.e.*, pelvis, femur, and tibia), followed by the upper part of the front limb (*i.e.*, scapula, humerus, radius, and ulna). The distribution is shown in Figure 26.3. A smaller percentage of identified sheep/goat elements belonged to the head and teeth. Aside from the astragalus and calcaneus, remaining foot elements (not shown in Fig. 26.3), particularly metapodials and phalanges, figured insignificantly in NISP counts.

A second important observation from the patterning of sheep/goat bones identified from the Heroon deposits at Nemea is that of a clear preference for the left side of the animals, especially among the caprine limb fragments. The distribution is far different for the other identified species, where cranial and dental elements predominate, and with no side preference noted.

Although taphonomic factors certainly contributed to forming the faunal assemblage at Nemea, it is unlikely that the patterns of left-side predominance and skeletal part biases are solely related to these forces, or to recovery issues, for that matter. All bone materials from the site were sieved. The same can be said for burnt bone assemblages among the samples from other sites, such as Kourion and Halieis. Sieving (or at least assumed careful retrieval) was also extensively conducted at most of the other sites mentioned above. The assumption here is that samples represent a fairly complete array of what was available to recover. As far as taphonomic issues are concerned, experiments do indicate a higher survival probability for denser, more durable skeletal limb-bone elements, such as the distal epiphysis of the tibia, proximal end of the ulna, and astragalus (Brain 1976; Lyman 1994), which in part could explain the predominance of these elements in the Nemean assemblages. However, the distribution still remains skewed in favor of upper limb elements, even when these taphonomic biases are standardized. Moreover, the frequency of dental elements is much too small across the Nemean Heroon assemblage to infer that no selection or removal of head elements took place. If whole animals were sacrificed, burnt, and disposed of in the Heroon, then one would expect more of a balance across skeletal part categories, not to mention a more equal distribution between left and right sides. As shown in Figure 26.3, this is not the case.

The preference for the left side noted among the sheep/goat remains in the Heroon at Nemea is intriguing, and unique among available zooarchaeological contexts from ancient sites. As outlined already, the preference for right side has been observed in the cults of Apollo at Kourion and at Halieis; however, in these cases, Apollo, a heavenly divinity was being honored. By contrast, Opheltes is a hero, not a god, and has chthonic ties in his "doom" persona as Archemoros. The choice of left side, therefore, may have underworld connections, thereby distinguishing his chthonic hero cult from that of the heavenly deity Apollo.

Zeus was also a patron deity at Nemea; however, available zooarchaeological materials from his temple and altar at the site were of insufficient size to determine if the "missing" right side elements from the Ophletes area were offered to Zeus. Faunal deposits elsewhere from the site also showed no side predominance, nor did they contain the "missing" right side elements moderately absent in the Heroon.

While parallel cases for left-side animal sacrifices in the Old World are unknown, possible examples have been noted in the New World. Mary Pohl (Pohl 1983, 89–90; Pohl and Pohl 1983; Pohl 1985) found "a statistically higher proportion of left elements of birds and deer in a few…[Mayan] ritual deposits [including the site of Seibal], suggesting a differential use of body side in ceremonial contexts" (Emery 2004, 108). Kitty Emery (2004, 109) suggests a similar phenomenon for the Mayan site of Cueva de los Quetzales. Here, left-side deer elements outnumber those from the right, but only by a ratio of about 1.2:1. Emery (2004, 109) also notes that most of the elements from galliform birds at this site are also left-side elements; however, the sample here is very small and, in this sense, statistically unreliable. Overall, the left-side predominance among these Mayan examples is neither as clear as the Nemean case discussed above, nor as statistically skewed, as has been found in other ancient examples, such as those for right side choice. Still, the possibility that the ritually imbued left side was sacrificed to underworld deities in these Mayan sites is interesting, especially in light of the fact that the phenomenon occurs in cave sites – which themselves often are associated with the underworld and the setting sun in this context (Grossen 1974). In this regard, they parallel nicely the Opheltes/Archemoros underworld connection from the site of Nemea. As Emery (2004, 109) explains:

> Ethnohistoric documents record the fact that during certain ceremonies the priest is given a cut of deer (Landa 1978, 62–63; Taube 1988, 244), and perhaps that was from the left side. Possibly the ritually imbued left side was habitually sacrificed to the gods. This metaphorical use of animal carcass portions as sacrifices or offerings likely represents private or public exclusionary rituals and not large-scale festivities or feasting during which whole animals would have been consumed.

Conclusions

Overall, this short overview of right and left side choice in zooarchaeological remains prompts some generalized patterns of right side dominance (and its association with positive, heavenly qualities), leaving the left side connected to underworld figures, at least among those cultural groups (including the ancient Greeks, Romans, and Mayans) who recognized such a divide. Why the right side is ascribed favored, "heavenly" status, however, is another matter, presumably linked more so to structural and psychological theories about binary divisions in human cognition, ideology, behaviour, and symbolism. Perhaps, this ultimately relates to a human propensity to be right-handed. Nevertheless, there is certainly more to learn in this area, and all zooarchaeologists should be encouraged to provide more recording of left and right sides of elements in future zooarchaeological reports, for all contexts (and not simply ritual ones), as there may be some patterns within these contexts too, which are masked when left and right side data are pooled together. Intriguing parallels may exist in assemblages from China, where the left side is preferred (Corballis and Beale 1976, 192). Further research into the connection of ritual dining, and the relationship of side choice to banquet participants and honorees (divine or mortal), is also required. Moreover, picking left or right sides and/or particular elements of sacrificial animal victims, is only one means to distinguish structural or symbolic oppositions. The notion of sacrificing male or female animals to different deities is often mentioned in ancient Greek and Roman texts, but is not always readily discernable from zooarchaeological remains. A similar scenario presents itself with aspects such as hide color. However, both of these characteristics may become more routinely recognized through advancements in DNA work. Placing an animal in a certain direction (*e.g.*, facing Mecca) is also a symbolic action in animal sacrifice. Whether or not dichotomies existed for heavenly and underworld deities in the positioning of animals on their fronts *vs*. backs, or with head first *vs*. feet first, are further paths to explore, although admittedly difficult, if not impossible to determine on the basis of zooarchaeological evidence alone. Analysis of butchery marks, as well, may be another avenue to follow, with different procedures earmarked for different sacrificial victims (be these for heavenly or underworld figures, or gods versus heroes or mortals). For example, all things being equal, perhaps different tools or procedures were employed in ritually killing and dismembering an animal offering depending upon which entity it was sacrificed to. Patterns may appear in the zooarchaeological record to help investigate such dichotomies. Certainly, there are many angles to pursue in future investigations.

Acknowledgements

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27. The Composition and Interpretation of Associated Bone Groups from Wessex

James Morris

This paper derives from work investigating the nature and interpretation of associated bone groups (ABGs), which have also been referred to in the literature as "special animal deposits." The project has involved the collection of all available published data regarding these deposits from the Wessex region, southern England. The information presented here comprises the initial results. The past and current interpretations for such deposits are discussed with differences between periods, and the influence of archaeological paradigms highlighted. The species proportion and composition of ABGs are investigated for sites dating from the Neolithic to the Medieval period. The results indicate that a number of changes occur in the ABG assemblages between time periods, possibly due to social change. The transition between the late Iron Age and Romano-British period is investigated in depth. Results show that the composition of ABGs from rural settlements changed very little until the middle Romano-British period. However, urban sites display a "Romanised" pattern from the beginning of the Romano-British period. Finally, the current trends of ritual interpretations for ABGs are discussed.

Keywords: Associated Bone Group (ABG), Special animal deposits, Wessex, Romanisation, Ritual

Introduction

The majority of archaeologists are now aware that the study of faunal remains can offer much more beyond economic and ecological interpretations. During the last decade zooarchaeologists and archaeologists have shown an increased interest in the non-economic aspects of zooarchaeology (*e.g.*, Anderson and Boyle 1996; Gilhus 2006; Grant 2000; Grigson 1999; Hamerow 2006; Hill 1995; Lauwerier 2002; Marciniak 2005; Méniel 1992; Ryan and Crabtree 1995; Wilson 1992; Woodward and Woodward 2004). This "social zooarchaeology" has mainly concentrated on the "ritual" interpretation of Associated Bone Groups (ABGs). These consist of deposits of faunal material from the same animal which are often articulated.

This deposit type has long been recognised in the archaeological record, under a number of different names; "animal burials" (Wheeler 1943, 115), "butchery waste" (Maltby 1985), "culled deposit" (Maltby and Coy 1981), "fall victim" (Maltby 1993), "feasting waste" (Armour-Chelu 1991), "sacrificial offerings" (Ross 1968) and "special animal deposit" (Grant 1984, 533; Wait 1985, 122). The uses of the above descriptions fail to separate the deposit type from its interpretation. To combat this problem Hill (1995) utilised the term Associated Bone Group (ABG) as it has no interpretive connotations. Because of this advantage the term will also be used here.

The definition of an ABG is variable. A number of previous studies such as Grant (1984) and Hill (1995) have included deposits of single bones in their examination of ABGs. Deposits of complete and fragmented skulls are often included, even if there was no sign of them having been deposited in articulation with other elements. Complete mandibles, particularly of horses, again deposited as a single unarticulated element have also been classified as "special animal deposits." This paper is concerned with deposits of elements from the same individual. Therefore single bone deposits defined as "special deposits" have not been included in the analysis.

This paper is derived from part of a Ph.D. project in which two main aspects of ABGs were investigated, firstly the composition and secondly the interpretation of these deposits. Data were collected from Wessex and Yorkshire. The provisional results from Wessex will be presented in this paper, which includes data from the counties of Dorset, Hampshire and Wiltshire. Although not constituting an archaeologically distinctive region, due to restrictions placed on data collection, the current county boundaries formed a useful sample. The results are derived from a systematic search of monographs, journals and Ancient

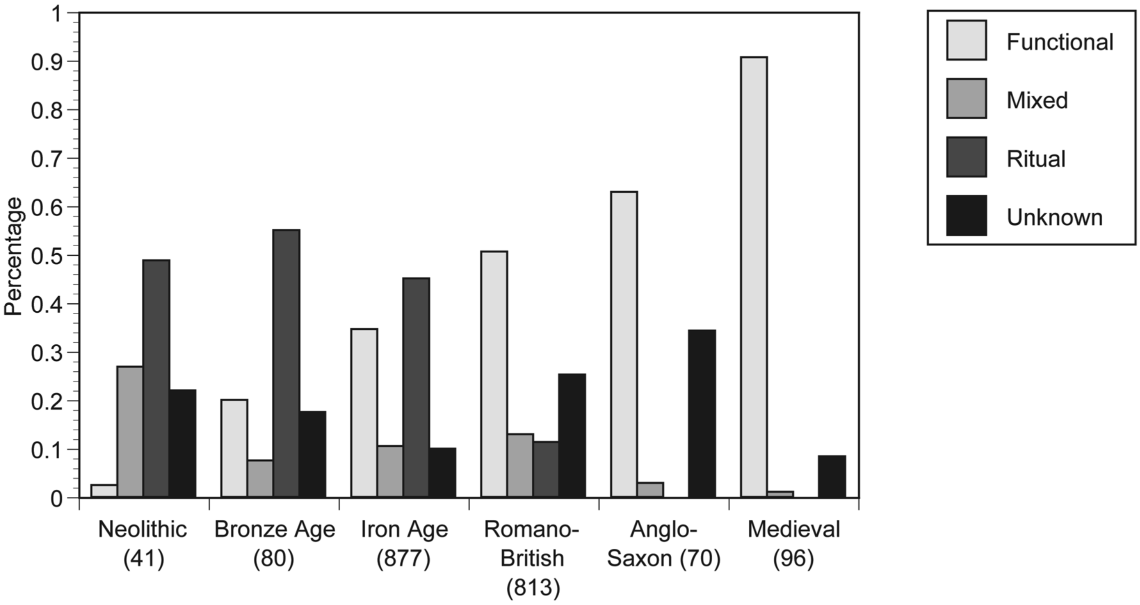

Figure 27.1. Graph showing the interpretation given to ABGs by archaeologists from each time period covered by this study.

Monument Laboratory (AML) reports dating from 1945 onwards (a full list appears in Morris 2008a).

Past and Current Interpretations

As discussed above, this project has used the term ABG because it removes interpretive connotations. The purpose and possible meaning of ABG deposits has been the subject of much discussion in the archaeological literature, resulting in a number of different interpretations. To investigate this aspect, the interpretation of each individual ABG has been recorded. These can be subdivided into four main categories: *ritual* (including feasting, grave goods, sacrificial offering), *functional* (including butchery waste, victims of disease, falls, natural deaths), a *mixed* explanation, stating ritual and functional interpretations but not drawing a conclusion, and *unknown*, where no interpretation is offered.

The most common interpretation given for these deposits differs according to the period to which the ABG dates. If the ABG dates to the Neolithic or Bronze Age then a ritual interpretation is more likely (Fig. 27.1). There is an increase in the number of functional explanations given for ABGs dating to the Bronze Age. This appears to be due to more ABGs being discovered on settlement sites. The number of ritual interpretations offered for ABGs in the Iron Age decreases compared to the Bronze Age, and there is a relative increase in the number of functional explanations. The Romano-British period appears to be the transition point where ABGs have commonly been regarded as the by-products of functional activities, rather than ritual ones. So far, no ritual explanations have been offered for ABGs from the study area dating to the Anglo-Saxon and Medieval periods. However, Hamerow (2006) has recently reinterpreted some Anglo-Saxon ABGs as resulting from ritual activity.

There therefore appears to be a general trend that ABGs dating to a prehistoric period are considered more likely to be formed by ritual activity, whereas those dating to an historic period are given a functional explanation. This is taking into account ABGs discovered from the 1940's onwards. The interpretation of these deposits has developed through the last century. The data collected for this project indicate that the interpretations offered have changed as archaeological theory developed. Neolithic and Bronze Age ABGs were the first to be investigated regarding their possible ritual nature, with studies concentrating on deposits from central Europe (Behrens 1964; Gabałówna 1958; Piggott 1962). This work influenced the interpretation of some finds within Britain, for example complete Neolithic or Bronze Age dogs found in association with human remains started being interpreted as ritual deposits (Bailey 1967; Bunting *et al.* 1968; Grinsell 1959). However, such interpretations were the exception. Before the 1980s, the majority of ABGs were not commented upon. By the 1980s, 42% of Bronze Age ABGs were being interpreted as ritual deposits. Unfortunately, the sample size for Neolithic ABGs is too small for comparison. By the 1990s, 58% (11) of Neolithic and 64% (16) of Bronze Age ABGs were given a ritual explanation. During the current decade, all ABGs for both periods have been given either a ritual or a mixed interpretation.

No ritual interpretations were offered for the remainder of the archaeological periods until the 1980s when ABGs were either given functional explanations or not given one at all. Also, before the 1980s, few site reports mention the presence of ABGs (see below). This would seem to correspond with the general trend that archaeologists of the 1960s and 1970s were reluctant to investigate the role of ritual and religion (Renfrew 1994). The "palaeoeconomic" school at Cambridge took a hard line in stating that "the soul leaves no skeleton" (Higgs and Jarman 1975, 1).

Ritual was viewed as unimportant and not worth studying on archaeological sites.

As discussed in Morris (2008b) for Iron Age ABGs, this changed in the 1980s with 40% (233) given a ritual explanation. However the majority of these came from Danebury. In the 1990s, there was a drop to 15% (12) of ABGs being given a ritual explanation. This could be due to a smaller sample size or a large number of faunal reports which were written in the 1980s and in some cases the 1970s but only published in the early 1990s. It could also be an indication, as Grant (1991, 482) states in her second Danebury report, that not all zooarchaeologists were accepting of a ritual interpretation for ABGs:

> There is also, it must be added, an undercurrent of scepticism about these animal deposits, and some have argued, privately and publicly, though not necessarily in the press, that they represent nothing more than natural deaths of animals that died in circumstances that render them unfit for human consumption (Grant 1991, 482).

However, ritual explanations of ABGs dominate reports from the late 1990s. This is also reflected in results from the current decade, where 95% (144) of ABGs have been interpreted as being ritual in nature.

The Romano-British period ABGs display a different pattern to those from the Iron Age. Ritual interpretations were not often offered until the 1990s. For example, of the 452 individual ABGs reported upon from Romano-British contexts in the 1980s, only three (0.6%) were given ritual interpretations. However, 90 ABGs were given a mixed interpretation, perhaps showing an unwillingness at the time to put forward ritual interpretations of Romano-British deposits. There was an increase in the number of ritual interpretations from this period in the 1990s (12% (28)). However, ritual interpretations have increased dramatically in the current decade with 81% (36) of ABGs given a ritual explanation.

The interpretation of Anglo-Saxon and Medieval ABG deposits shows a very different pattern. No ritual explanations have been recorded so far. Until the late 1990s all explanations were functional in nature. However, a small number of mixed interpretations have been offered in recent publications such as the complete Anglo-Saxon dog ABG from the Matthew Estate, Wiltshire (Gooden *et al.* 2002).

It therefore appears that the interpretation of these deposits is influenced by a number of variables, including the period the deposits date to, preconceptions regarding that period, and current archaeological trends towards the study and recognition of ritual (Bradley 2005, 31–2). Until recently, it appears ritual interpretations were limited to ABGs from prehistoric periods. However, this is no longer the case, Romano-British (Fulford 2001; Woodward and Woodward 2004) and Anglo-Saxon (Hamerow 2006) ABG deposits has also been interpreted as the result of ritual activity.

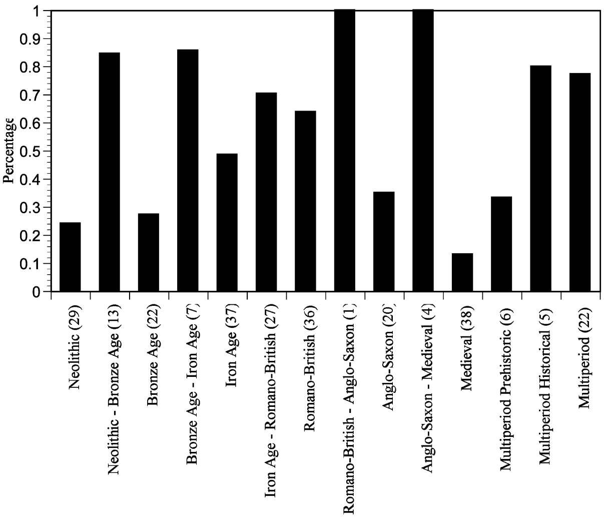

Figure 27.2. Graph showing the percentage of sites with ABGs present for each period. The total number of sites for each period is shown in brackets. Multi-period Prehistoric covers sites that were utilised from the Neolithic to Iron Age, Multi-period Historic refers to sites that were utilised from the Romano-British to Medieval periods. Multi-period covers sites that span a number of prehistoric and historic periods.

The Current Data Set

Data have been collected from 267 sites with faunal remains present. Not all sites had recorded ABGs as being present. Currently, ABGs have been reported from 130 sites, whereas the remaining 137 sites do not report the presence of ABGs. However, the presence of ABGs may not have been noted by some excavators or been deemed unworthy of reporting. Currently only 9 of 25 sites reported upon before the 1970s state that ABGs were present. In comparison 71 of 127 (56%) sites published after 1990 report ABGs as being present. Therefore, ABGs were more likely to be noted from 1990 onwards. This may be due to the work of Grant (1984) and Hill (1995) who raised awareness of this deposit type. Thus, sites excavated earlier in the last century may have had ABGs present but were not noted. This does not, however, mean that older data cannot be used, just that it is necessary to be cautious when comparing relative abundance.

There are also differences between time periods in the proportion of sites with ABGs present (Fig. 27.2). The majority of sites in the region dating to the Neolithic (4000–2500 BC) or the Bronze Age (2500–700 BC) appear not to have ABGs present. This, however, does not appear to be the case for some sites utilised in both periods. Roughly half the sites with ABGs dating to these periods were round barrows, such as Bishops Cannings barrow 81 (Grigson 1980), Winterbourne Stoke barrow 44 (Green and Rollo-Smith 1984) and Down Farm pond barrow (Legge 1991). However, the majority of sites from the Neolithic and Bronze Age that do not contain ABGs are also funerary monuments. It may therefore be the case that there is an increase in the deposition of ABGs at funerary sites in the

Species	Neolithic (41)	Bronze Age (80)	Iron Age (877)	Romano-British (813)	Anglo-Saxon (70)	Medieval (96)
Cattle	46.3%	46.3%	16.2%	10.7%	27.1%	6.3%
Sheep/Goat	7.3%	30.0%	33.9%	12.7%	8.6%	15.6%
Pig	19.5%	2.5%	11.6%	8.0%	8.6%	12.5%
Horse	-	6.3%	16.6%	3.2%	4.3%	7.3%
Dog	12.2%	13.8%	16.4%	42.9%	37.1%	10.4%
Cat	-	-	0.8%	4.6%	5.7%	5.2%
Wild Mammal	14.6%	-	2.6%	4.1%	-	7.3%
Domestic Fowl	-	-	0.7%	5.3%	2.9%	27.1%
Other Domestic Bird	-	-	-	-	-	4.2%
Wild Bird	-	1.3%	1.1%	8.6%	5.7%	4.2%

Table 27.1. Table showing the percentage of species for ABGs in each period. The number in brackets is the total ABG sample size for the time period.

late Neolithic/early Bronze Age, but then a decrease in the middle Bronze Age.

The majority of the current data comes from sites dating to the Iron Age (700 BC–AD 43) and Romano-British (AD 43–450) periods with currently 50% of the sites with ABGs present dating to one or both of these periods. These periods also contain the highest number of individual ABGs with 85% of those recorded coming from these two periods (Table 27.1). Although the majority of work involving ABGs has concentrated on the Iron Age (*e.g.*, Cunliffe 1992; Fitzpatrick 1997; Grant 1984; Green 1992; Hill 1996; Knight 2001; Méniel 1992; Ross 1967; Wait 1985; Wilson 1999), Romano-British sites appear to be more likely to have ABGs present. Surprisingly, 52% of the sites examined dating to just the Iron Age have no ABGs present, whereas 36% of sites dating to just the Romano-British period have no ABGs present. However, although fewer Iron Age sites produce ABGs they do so in slightly greater numbers than in the Romano-British period, which may relate to overall faunal sample sizes.

The number of sites with ABGs present drops in the sample from the Anglo-Saxon (AD 450–1050) and again in the Medieval (AD 1050–1550) periods, with 35% of Anglo-Saxon sites and only 13% of Medieval sites having ABGs present. However, the Medieval period has produced more individual ABGs than the Anglo-Saxon period (Table 27.1).

As this brief description has indicated, there are large numbers of ABG data available from the Wessex region (Fig. 27.3). The remainder of this paper will concentrate on the species proportions and compositions of ABGs and how these proportions change between different time periods. Due to the large sample from the Iron Age and Romano-British periods, results from these periods dominate the discussion.

Species Proportion and composition

Domestic animals dominate the ABG assemblages from all time periods covered in this study. However, the relative proportions of individual species differ between them. Cattle (*Bos taurus*) remains form the highest proportion of ABGs in the Neolithic and Bronze Age. Caprines (sheep [*Ovis aries*] and goat [*Capra hircus*]) do not comprise a substantial proportion of the ABG assemblage until the Bronze Age. Also, wild mammals are the third most common ABG in the Neolithic, due to deposits of roe deer (*Capreolus capreolus*) and red deer (*Cervus elaphus*) at sites such as the Coneybury 'Anomaly', Wiltshire (Maltby 1990) and Thomas Hardye School, Dorchester, Dorset (Smith 2000), respectively. The proportion of caprines present in the assemblage remains relatively consistent from the Bronze Age to the Iron Age periods. However, the proportion of cattle ABGs falls dramatically, with the relative number of horse (*Equus caballus*) and dog (*Canis familiaris*) rising.

Dog, horse, and wild birds have received much attention in the literature for their "ritual" deposition as ABGs in the Iron Age (Grant 1984; 1989a; Green 1992; 2001; Hill 1995, 104–105; Ross 1967). Dogs, horses, and wild birds such as the raven (*Corvus corax*), have been seen as animals closely connected with spirits/deities and therefore worthy of "special" deposition. Hill (1995, 107) and Méniel (1992, 142) see the horse and dog as important animals for deposition, closer to humans than other species. However, the data collected for this study indicate that sheep/goat were the most commonly deposited ABG, although this does not necessary equate to their being the most important animal for deposition, if the ritual nature of such acts is accepted.

There is a shift in the species proportions in the Romano-British period, with dog ABGs becoming most common, followed by caprines and cattle. Also, the Romano-British period produced the highest number of wild bird ABGs of all periods. Roughly one third of the wild bird ABGs consist of corvids, the remainder including buzzards (*Buteo buteo*), ducks (Anatidae), pigeons (*Columbia livia*), and red kites (*Milvus milvus*) and an assemblage of 30 swallows (*Hirundo rustica*) from the Oakridge well (Maltby 1993) making up the other two-thirds. Dogs remain the dominant ABG in the Anglo-Saxon period although the relative number of cattle ABGs also increased. The assemblage from Medieval sites is the most distinctive as it is dominated by domestic fowl (*Gallus gallus*), with caprines the second most numerous ABG species.

An interesting aspect of the ABG assemblage, which was

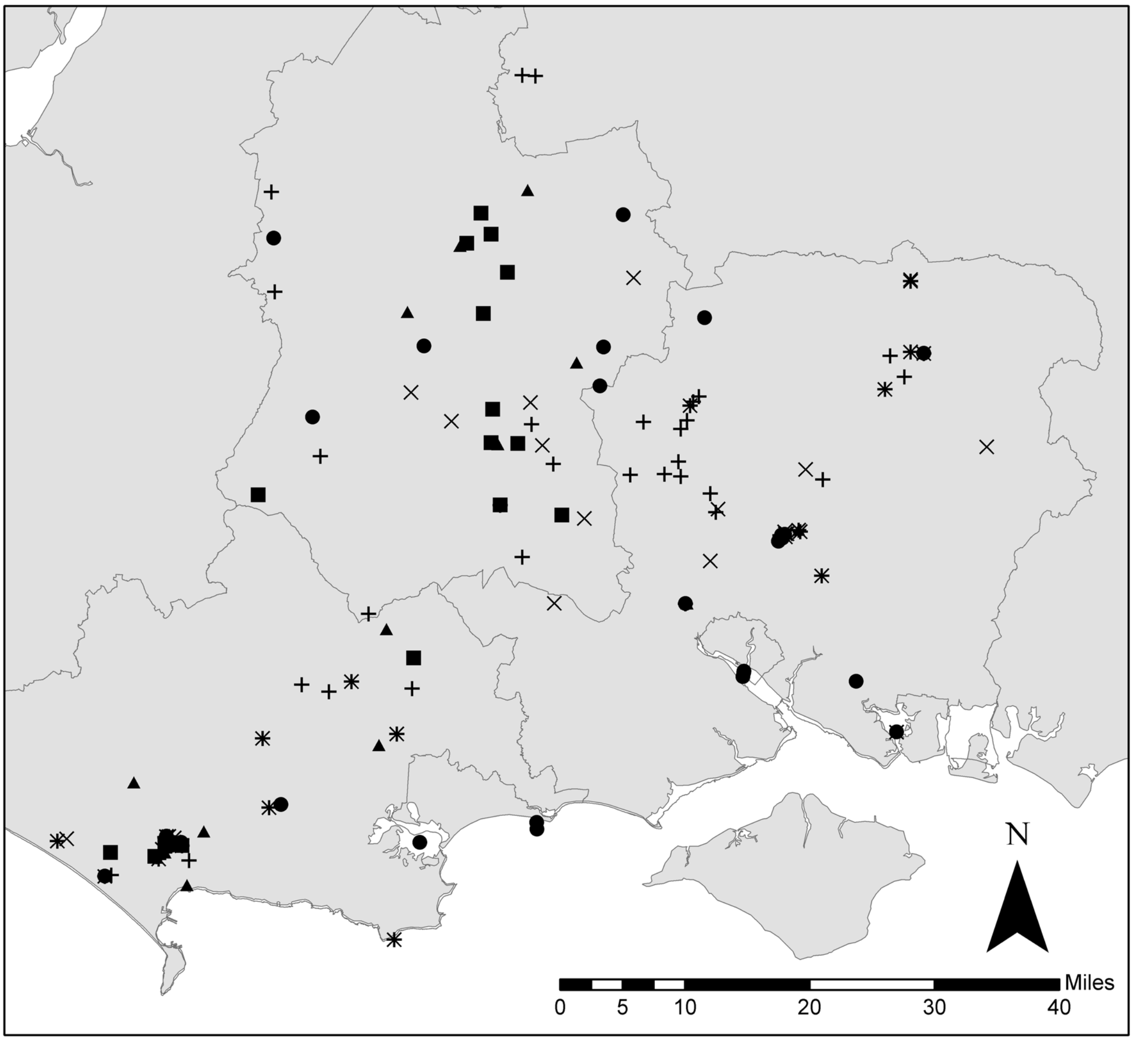

Figure 27.3. Map showing the location of sites with ABGs. From left to right the counties present are Dorset, Wiltshire and Hampshire. The symbols indicate the date of the sites. Square=Neolithic, triangle=Bronze Age, cross=Iron Age, X=Romano-British and circle =Medieval

also noted by Grant (1984), is that the species proportions are not the same as in the "normal" disarticulated faunal assemblage. For example, caprines also dominate the "normal" faunal assemblage from Iron Age Wessex, but generally to a greater extent (Hambleton 1999, 87). Dog and horse bones are not normally as common amongst the faunal assemblage as a whole. For example, combined, these species constitute 6% of the total disarticulated faunal assemblage from Danebury (Grant 1991, 449). Therefore, if the ABG assemblage were a representation of what could be considered the "normal" economic faunal assemblage, a higher proportion of the ABGs would be expected to consist of caprines with a much smaller percentage of dog and horse remains.

The composition of the ABGs also differs with each time period. For this study, the composition of each ABG was recorded, whether it was "complete" or "partial". Complete means that all body areas were represented, the body areas consist of the head, the axial skeleton (vertebrae, ribs, pelvis), upper legs (scapula, humerus, radius, ulna/femur, tibia, fibula) and lower legs (carpals/tarsals, metapodials, phalanges). A complete ABG does not necessarily have every skeletal element present, as elements may be missed during excavation or become disarticulated due to post-depositional movement, but has the majority of each body area represented.

A number of patterns are consistent across the periods (Table 27.2). Large animals such as cattle and horse commonly form partial ABGs. The only exception is a number of complete horse ABGs from the Medieval period. These are from three main sites: Faccombe Netherton, Hampshire, a manorial site (Sadler 1990), St Georges Road, Dorchester (Bullock and Allen 1997) and West Mead, Dorset (Hamilton-Dyer 1999). Caprines and pig show a slightly different pattern. Complete caprine and pig ABGs seem to be more likely to be found in sites of the Iron Age and Romano-British periods. The results show that 33% of caprine ABGs from the Neolithic period are complete. However, this is due to a very small sample size, and the only complete caprine ABG is represented by a individual deposit from Whitesheet Hill, Wiltshire (Maltby 2004).

Dog appears to be the only species which is consistently

Species	Neolithic	Bronze Age	Iron Age	Romano-British	Anglo-Saxon	Medieval
Cattle	100% (19)	83.8% (37)	90.1% (142)	86.2% (87)	100% (19)	83.3% (6)
Sheep/Goat	66.7%(3)	70.8% (24)	80.8% (297)	79.6% (103)	100% (6)	40% (15)
Pig	100% (8)	100% (2)	60.8% (102)	70.7% (65)	100% (6)	41.7% (12)
Horse	-	100% (5)	97.3% (146)	84.6% (26)	100% (3)	57.7% (7)
Dog	80% (5)	54.5% (11)	53.5% (144)	29.7% (349)	30.8% (26)	70% (10)
Cat	-	-	14.3% (7)	51.3% (37)	75% (4)	100% (5)
Wild Mammal	100% (6)	-	26.1% (23)	30.3% (33)	-	28.6% (7)
Domestic Fowl	-	-	33.3% (6)	72.1% (43)	100% (2)	19.2% (26)
Other Domestic Bird	-	-	-	-	-	100% (4)
Wild Bird	-	100% (1)	90% (10)	48.5% (70)	50% (4)	50% (4)

Table 27.2. Table showing the percentage of ABGs which consist of partial ABGs for each species per period. The number in brackets indicates the sample size.

represented by a large proportion of complete ABGs. The main exception is for the Neolithic period where a number of partial dog ABGs are present from Windmill Hill, Wiltshire (Grigson 1999). There are also a high proportion of partial dog ABGs from the Medieval period, especially from Winchester, Hampshire (Coy 1984). Fewer than half the dog ABGs from the Bronze Age and Iron Age are complete. However, a high proportion of the partial dog ABGs from these periods consist of mixed deposits, with some areas of the head, axial skeleton and legs represented. They therefore may have been deposited as complete but due to secondary deposition and other post-depositional taphonomic effects they may have become disarticulated.

A high percentage of wild mammal ABGs from the Iron Age, Romano-British and Medieval period are complete. However, the results are skewed by deposits from a small number of sites. The Iron Age sample is dominated by the deposit of twelve fox (*Vulpes vulpes*) ABGs found in the same pit and associated with a complete red deer ABG at Winklebury Camp, Hampshire (Jones 1976; 1977). The Romano-British wild mammal ABG assemblage is dominated by the deposits found at Oakridge, Hampshire, where thirteen complete polecats (*Mustela putorius*) as well as complete red and roe deer are present (Maltby 1988; 1993). Almost all the complete wild mammal ABGs from the Medieval period come from the manorial site of Faccombe Netherton, Hampshire, again fox and polecat are represented (Sadler 1990).

Iron Age – Romano-British transition

Due to the large sample size and distinct changes, the transition from the Iron Age to Romano-British periods has been examined in depth. As discussed in Morris (2008b), species proportions also differ between site types. Pig ABGs are much more common on hillfort sites in the early to middle Iron Age periods. However, this changes in the late Iron Age, with pig ABGs becoming more common on non-hillfort sites. Cattle ABGs are also common on hillforts until the late Iron Age.

A number of differences are also present between urban and rural settlements from the Romano-British period. The ABG species proportions for urban sites remains consistent through the Roman period, with dog ABGs often consisting of 50% of the assemblage or more. Caprines and pig are the second and third most common ABGs respectively. However, species proportions from rural settlements display a different pattern.

Overall, the rural settlements show a similar pattern to the towns with dogs dominating, except that cattle are the second most common ABG. When investigated in depth, the pattern from early Romano-British (AD 43–150) rural settlements differs from the ABG assemblages of later sites. The most common ABGs are from caprines followed by dogs. When compared to late Iron Age rural settlements (non-hillfort sites), the patterns are very similar (Fig. 27.4). There appears to be a change in the deposition of ABGs around the middle of the Romano-British period, with a drop in the number of caprine ABGs and an increase in the number of dogs deposited. The rural settlements' pattern from the middle Romano-British period onwards is very similar to that found on town sites. However, the pattern is found on town sites from the beginning of the Romano-British period.

A number of other changes occur in the ABG record around this period. The majority of partial cattle, caprine and horse ABGs found on late Iron Age rural settlements consist of elements from the axial skeleton, mainly the vertebral column, ribs and skull. This remains the case in the early Romano-British period. However, this changes by the middle Romano-British period, especially in the composition of partial cattle ABGs. The vertebral column is still one of the most common body areas present, but not to the same extent. Also, skulls and ribs are hardly present (Morris 2008b).

As stated in Morris (2008b) there is a change in butchery style and equipment between the late Iron Age and middle Romano-British period. This is linked with a shift in the level of exploitation for meat (Seetah 2005). During the Iron Age the knife is the most common tool used for butchery (Maltby 1989). This tends to leave specific cut marks across the bone, some of which are present on ABGs. However, a skilled butcher could process a whole animal and leave

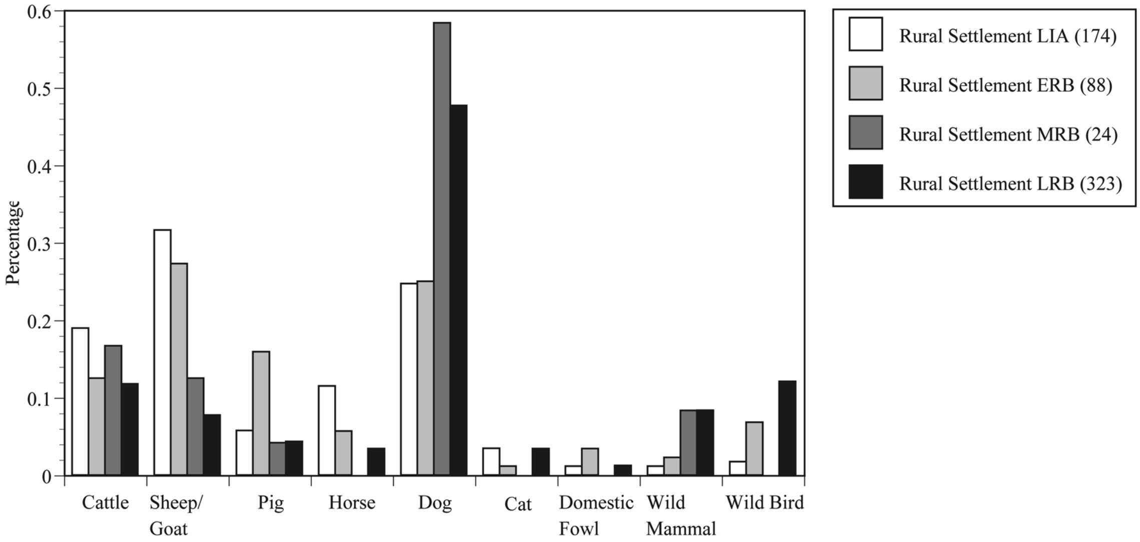

Figure 27.4. Graph showing the percentage composition of ABGs from rural settlements from the late Iron Age to the late Romano-British periods. The number in brackets indicates the sample size.

no trace of a cut mark. The Romano-British period sees a change in butchery methods and technology. During the Iron Age, large animals were probably not hung (Wilson 1996, 32) and butchery was carried out on the ground with a knife. In the Romano-British period, specialist butchers would have been present in towns (Rixson 2000, 69), carcasses would be hung and butchery took place with a cleaver (Seetah 2006). This new style of butchery produced a clearly visible pattern of dismemberment, where specific joints such as the femur and pelvis were dismembered by cleaving the femoral head. Other traits included an intensification in the breakage of cattle limb bones for marrow (Maltby 2007).

The overall reduction in the number and change in composition of cattle ABGs may be a result of the change in butchery practices. The Romanised style of butchery is more likely to result in disarticulation, as it was based around fast processing. However, specialist butchers would have been more common in towns. Iron Age methods did, however, continue on some rural sites (Maltby 1994) which may be the reason cattle and horse ABGs are more common on Romano-British rural sites compared to towns.

The changes described above can be seen as part of Romanisation. This was originally considered to represent the process of cultural change whereby native Britain became "Roman" through the dominant force of the Roman Empire. A number of authors have suggested that is a one-sided simple abstract view, and that Romanisation has never been adequately defined, and has meant different things to different scholars (Fitzpatrick 1989; Forcey 1997; Hingley 1996; Wells 2001). Recent studies have shown that communities adopted different aspects of Roman society at differing rates (*e.g.*, Goodman 1999; Wells 2001): that the term "Romanisation" is of limited use. In this way, changes in the archaeological record should be viewed as a continuous dialogue between a number of regional "native" and "Roman" agencies. Within this paradigm, ABGs have been viewed as a continuation of local native expression.

Anne Ross (Ross and Feachem 1976), expanding upon her earlier work (Ross 1968), investigated the Romano-British Newstead pits in the aptly named *"*Ritual Rubbish – The Newstead Pits.*"* Ross and Feachem (1976) argue that it is the nature of the deposits within the Romano-British pits that classify the features as having a ritual nature. Such deposits often included cattle, dog, and horse skulls, animal skeletons, human remains, complete pots, ornaments, metalwork, and stonework. Clarke (1997) revisited the interpretation of the pits and concluded that they represent a continuation and development of prehistoric activities. In the same volume, Richardson (1997) argues that at La Pâtural in central France there is a continued use of "special" ABG deposits into the Roman period, although interestingly at this site there is a move away from dog ABGs.

We could view the similarity of ABGs deposited on rural settlements in the late Iron Age and early Romano-British periods as a continuation of native practices, possibly in conflict with the Roman ABG depositional practices taking place within the towns. The change by the middle Romano-British period in both species and composition of ABGs may be seen as a gradual integration of Roman practices. Patterns in the rest of the faunal assemblage also indicate that changes had occurred in diet and stock size by the middle Romano-British period (Grant 1989b; King 1999; Maltby 1994).

Current theory regarding the deposition of ABGs now regards them as a continuation of Iron Age ritual activity (Fulford 2001). Clarke (1999) argues that the deposition on Romano-British sites as well as Iron Age ones, was controlled in large part by behavioural patterns that to us appear as illogical responses to superstitious or religious beliefs. It would certainly appear that there is a continuation of the deposition of partial and complete animals as discussed above, but should we be so accepting of a ritual explanation for these deposits? It appears that the interpretation of these deposits has swung between two dichotomous interpretations: functional and ritual. The changes in species proportion and composition between the Iron Age and Romano-British periods could be seen as being due to alterations in ritual deposition, or alternatively changes in butchery practices. As discussed above, a major change in the type of butchery methods used occurs in the Romano-British period, especially in towns. Therefore, the patterning seen in the ABGs record may not only be reflective of an increase in the number of dogs being deposited as ABGs, but also a decrease in the number of cattle, caprines, pig and horse. This decrease may be due to these animals being subject to a more intensive form of butchery compared to the Iron Age, therefore resulting in fewer ABGs being produced. The butchery methods utilised in the Iron Age are more likely to leave connective tissue present on the bone resulting in articulation (Wilson 1996, 32). In comparison, the Romanised style of butchery is more likely to result in complete disarticulation, as it was based around fast processing.

Perhaps the main problem is in how the interpretation of these deposits has been dominated by dichotomous thinking. They are either ritual or functional. This need not be the case. The same butchery processes are used for "functional" and "ritual" carcass processing (Hill 1996; Wilson 1992; 1999). Just as the same domestic animals make up the "ritual" and "functional" faunal assemblages, ethnographic studies would suggest that most pre-industrial societies did not distinguish animals in such a way (Serjeantson 2000).The study of ABGs has an inherent problem, common to all of archaeology, which concerns our use of language. The problem with the terms "ritual" and "functional" is that as abstract ideas they have proved to be very difficult to define, although many have tried, mainly regarding ritual (Levy 1982; Renfrew 1985, 20; Richards and Thomas 1984). Brück (1999) has suggested that we move away from the term "ritual" altogether and that by trying to examine "ritual" we are ignoring rationality, which to investigate we must reject the sacred and profane dichotomy which dominates our thinking. Bradley (2003, 2005) suggests placing less emphasis on ritual and more on the practice of ritualisation, where certain actions associated with a dominant concern of the society acquire an added emphasis through particular kinds of performance.

If we accept such arguments, then perhaps asking if these deposits represent ritual acts is the wrong question to be posing. Perhaps we should view these deposits as polythematic instead of monothematic. A number of interpretations can be given for these deposits, and it is highly probable that different agencies were involved with the creation of each ABG. Therefore there may have been a variety of rationales behind the deposition of each ABG, in other words, a combination of what could traditionally be viewed as functional and ritual reasons.

Conclusions

Many data have been presented here regarding ABGs from Wessex. Certainly this deposit type has been largely overlooked by zooarchaeologists until recently. The data collected indicate that this deposit type can be found from the Neolithic to the Medieval period. However, the species used and the composition of the ABGs changes between periods. This paper has tried to show that ABGs can help us to investigate changes in society, in particular the continuation of a late Iron Age pattern of deposition on rural settlements in the early Romano-British period.

The investigation has also shown that ABGs have been interpreted in a number of different ways in the archaeological literature. However, the current trend is for them to be seen as the result of ritual activity. This may be the case for some deposits, but the trend of interpreting the majority of ABGs as the result of ritual activity may be a step too far. This article has discussed ABGs being the result of either "ritual" or "functional" practices of past societies, because these are the interpretations given by the zooarchaeologists and archaeologists reporting on the deposits. However, the use of such dichotomous language can cause problems, as the terms become laden with preconceived ideas. Perhaps we should view these deposits as resulting from a number of different acts. Undoubtedly, some of the ABGs may have been the product of ritual activity, some functional, and others a combination to varying degrees. The problem now facing zooarchaeologists and archaeologists is how we move beyond our current monothematic interpretations.

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28. Making Themselves at Home: The Archaeology of Commensal Vertebrates

Terry O'Connor

Our discussion of the relationships between past peoples and the animals around them tends to be constrained by the dichotomy between species that we regard as 'domesticated', and those that we call 'wild'. This simple distinction obscures the existence of another group, namely those species that actively choose to share human living space, whether we invite them or not. These commensal species gain shelter, food and reduction of competition, whilst we may regard them as companion animals, vermin or just part of the domestic landscape. A period of synanthropic commensalism may have preceded domestication in some species (cats, cavies*), and some commensals will have been significant players in the food webs of human settlements (*corvids, murids*). Above all, perhaps, these are species that were an everyday part of peoples' lives in the past.*

Keywords: domestication, synanthropic, commensal

One of the distinctive things about humans is our propensity to form relationships with other species that go well beyond the trophic or mate-recognition responses that drive most other inter-species relationships (Do I eat it; run away from it; mate with it; ignore it?). Although some other species, notably other primates, occasionally show an interest in the animals that live around them, a marked predisposition to interspecies complexity may be a fundamentally human trait as much as tool-use or art. Whatever reconstruction we make of the human past, whether conceptual or rendered in art or enactment, other animals will be central to that reconstruction. Whether those others are Palaeolithic reindeer, Natufian gazelles, Roman mice and flies, Formative Period llamas, or Late Stone Age hyraxes, any conception of past human life without a complex web of interactions with other animal species is manifestly incomplete. Animals appear in the archaeological record as the bones of prey and domesticates; as artistic representations in two or three dimensions; as symbols standing in for deities, personal attributes, and a range of other abstractions (Fig. 28.1). Research into the relationships between past peoples and other animals have tended to the functional (*e.g.*, Hyams 1972; papers in Clutton-Brock 1989), though recent studies go further, to understand the role that animals played in human lives and in human perception of the world (*e.g.*, papers in O'Day *et al.* 2004; Acampora 2004). Zooarchaeology is developing a more complex and more subtle understanding of the mutual dependencies, and hence community ecology, of ourselves and other animals (Somerville 1999; Leach *et*

*Figure 28.1. Celebrating commensalism? Harlow Carr gardens, Harrogate, UK, has a metal sculpture of a robin (*Erithacus rubecula*) perched on a giant spade, in a garden in which real robins abound*

al. 2003). In doing so, it is addressing one of the most fundamental themes in the whole of archaeology, but at the risk of merely reflecting contemporary cultural attitudes and categorizations. This paper argues that there are other ways of grouping animals that may be more relevant to their place in our lives and to ours in theirs.

In pursuing these questions, archaeology is somewhat constrained by the Indo-European languages in which much of our work is published. In archaeology, as in everyday life, we make a simplistic binary distinction between "wild" and "domestic" (sauvages/domestiques; Wild-/Haustiere; salvajes/domésticos; gwyllt/dof) animals. This is all too commonly seen in zooarchaeology reports, with separate discussion, even separate data tabulation, of taxa classified *a priori* as wild or domestic. The two categories of taxa are presumed to have fulfilled different economic roles, even though the remains of some taxa will always present a challenge to this binary classification. In northern Europe, for example, the duck, *Anas platyrhynchos,* may be identifiable from well-preserved material, but the separation of domestic ducks from wild mallard is likely to be intractable, and their classification accordingly ambiguous. There are more than just semantic issues in how we comprehend "wild" and "domestic" (Wing 1993; O'Connor 1997; Zeder 2006), and those terms may not be the most useful that are available to us. Although such terminology derives from the nature of the relationship that we have with that species, and therefore how we regard it, the terms are used to categorise the other species, rather than directly categorising the relationship. If we consider the prehistory of human relations with a particular species, it may be appropriate to regard that species as having been a "wild" species that in due course became "domestic," having passed through a process that we call "domestication." However, the range of relationships that we share with other species today is far more gradational and subtle than a simple binary distinction. Even if we restrict our consideration to domestic animals, that category will include relationships that differ greatly from species to species (between humans and sheep, as against humans and dogs, for example). Thus, although the "wild/domestic" opposition may have some utility when considering a single species, it is not helpful when we try to describe and understand the range of relationships that have developed between humans and other species. It is not even helpful to distinguish points on a scale between wild and domestic in order to characterise those interactions (*pace* Wing 1993). To do so assumes that the end-points of that scale are the subject of unambiguous consensus, which they are not. This is not the place to review all of the definitions that have been offered for "domestic" animals. Suffice to say that some are essentially zoological, treating domestication as a form of speciation (*e.g.* Clutton-Brock 1992; Gentry *et al.* 2004), whilst others stress the social incorporation of the other species (Ducos 1989). What this paper proposes is not a more refined definition of domestication (nor of "wild", interesting though that would be), but an overview of a form of human-animal interaction that is widespread today, apparent in the archaeological record around the world, yet inadequately discussed and reviewed in the zooarchaeological literature.

The many species that shared the human past can, for the present purposes, be divided into three categories. Some were free-living; both behaviourally and spatially separated from people. There may have been some trophic interaction with contemporary human populations (*e.g.*, people hunting beavers; large felids hunting people), but the absence or local extirpation of either species would have had little impact on the other. In contrast, there were populations of animals under close human control; control of breeding, control of mortality, control of spatial distribution. Those populations were deliberately maintained by people for utilitarian reasons, and the animals were a significant part of the subsistence economy of the people concerned. Obviously, we could label those two contrasting categories of animals "wild" and "domestic" respectively, but under the deliberately narrow definitions given above many taxa that were important in the lives of past peoples would fit neither category. There is a third category, therefore, of animal populations that were (and are) closely associated with people, both behaviourally and spatially, and which would have constituted a familiar element of the operational environment of those people, yet which were not as fully controlled and constrained and not necessarily of any major economic significance. For want of any simple vernacular term, these animals can be described as synanthropic commensals; synanthropic because of their close spatial association with people, and commensal because those species typically derive trophic benefits from the association.

Commensalism is a common form of inter-species relationship by which two species closely associate to the benefit of one and with no detriment to the other (Boucher *et al.* 1982; Tchernov 1984). This distinguishes commensalism from parasitism, in which one partner (the host) is affected detrimentally, and in which the parasite generally feeds directly from the host during the whole (parasite) or a part (parasitoid) of its life-cycle. Commensal species generally benefit in terms of food, either by directly sharing the food source utilised by the host, or by enhanced feeding facilitated by the activities of the host. To give those essentially biological concepts some reality, our own lives feature many commensal animals. These include companion animals such as cats and dogs, uninvited house guests such as rats and mice, and many "wild" animals such as crows and urban foxes that are not obviously to be classed as pets or vermin yet which live lives that are closely aligned with and linked to our own. Commensal species include some that we might otherwise regard as "domestic" and some that might be classed as "wild", yet they have in common the commensal niche and the fact that they are species that feature prominently in human lives. It is the latter point that makes commensalism an important topic in archaeology. It has been argued that commensalism was an important form of pre-adaption on the part of would-be domestic animals (Budiansky 1992). This may be so, but commensalism should not be seen only as a stage on the nebulous "wild-domestic" axis, but rather as a particular niche worthy of research in is own right.

In adopting a commensal niche, the other species are responding to human activities and to the characteristics of the human operational environment. Given the dominance of human activities in the alteration of terrestrial environments over the last few millennia, a purely evolutionary perspective would see synanthropic commensalism as a positive adaptation: species that can adapt to living alongside humans gain fitness in a rapidly-changing world (Budiansky 1995). That is an incomplete explanation, however, as it presents humans in a passive role in the development of those relationships, even though it is clear from the ethnographic and historical records that people actively seek to incorporate other species into their lives and into their immediate environment. It could be argued that the grouping of commensal taxa proposed here blurs the distinction between the species that we adopted, and those that adopted us. However, that objection takes us back to one of the weaknesses of the wild/domestic dichotomy: a preoccupation with ascribing the origins of the relationship to one or other of the actors rather than studying the nature of the ongoing relationship. By studying past commensal relationships we can seek to understand people's perception of those other species – which were tolerated, which actively encouraged and so on – and their perception of us. This last point is important, because zooarchaeology too often regards sentient, intelligent animals as if they were subject to human decision-making, or to environmental and evolutionary pressures, but lacked any collective or individual agenda or motivation. As archaeologists, we try to regard the past from the human point of view, but we should not forget that pigs, bison and cats *had* a point of view, even if it is beyond our comprehension.

For a synanthropic commensal species, the attraction of living close to people may be for living space, or for reduced competition by avoiding less synanthropic competitors, but most often it is because of the availability of food. The synanthropic community essentially consists of three groups of taxa: species that scavenge human wastes and garbage, species that prey on our stored produce, and species that predate the scavengers and pests. Trophic benefit may be indirect, but none the less significant. A good example is the barn swallow, *Hirundo rustica*. During the breeding season, swallows in populated regions of northern and central Europe seek out human settlements, utilising barns and other open buildings for nesting space. Those buildings provide a degree of protection from variable weather, and reduce the competition for nesting space from less commensally-adaptable species. However, farms and other human settlements also develop dense populations of invertebrates that feed on and breed in human refuse and the dung and bedding of farm livestock. The nesting locations chosen by swallows thus provide them not only with space but also with a concentration of insect food, increasing the probability that a clutch of young will successfully be raised and that both they and the adults will be able to lay down sufficient muscle and fat to undertake the long southerly migration.

*Figure 28.2. Pigeons (*Columba livia*) in central Ljubljana, Slovenia, though they could be in almost any major town.*

To move from swallows to a more generalising model, it is worth considering the ecology of the commensal community in terms of a food web. On a conventional trophodynamic model, most food webs derive from Gross Primary Productivity (GPP) – the biomass of (usually) green plants sustained by solar energy and other major environmental parameters. However, food webs based around human settlements tend to be donor-controlled; that is, much of the energy input to the food web is from organic resources acquired by people and concentrated at the settlement site, not from the GPP of the location itself (O'Connor 2000). As a result, the structure of the food web and the abundance of different species in it are not limited by GPP. Accordingly, population densities are not limited in the same way as in a GPP-controlled food-web, and may be startlingly high, with adaptable omnivores tending to be favoured. This in turn increases the linkage density within the food web, which, some ecologists would argue, also affects its stability (Cohen *et al.* 1990). To summarise, we may expect the commensal-dominated communities that form around human settlements sometimes to include population densities greatly in excess of those seen in free-living populations of the same species, to feature broad-spectrum omnivores, and to be susceptible to sudden changes in composition. The synanthropic commensal species *par excellence* over much of Eurasia and North America is the pigeon, *Columba livia* (Fig. 28.2). Populations of free-living *C. livia* are limited to the wilder Atlantic fringes of Europe, whilst the commensal form is to be found in great abundance in towns and cities over much of Eurasia and North America, with substantial populations in parts of Australia, South America, and the islands of the Pacific (Long 1981; 208–11). Although the species has a history of captive and facilitated breeding in some parts of Europe, it is as a commensal species that *C. livia* has achieved greatest evolutionary "fitness." Curiously, although the bones of this species are commonly recovered from Roman and medieval sites in northern Europe, a zooarchaeological study of its ecological diversification has

*Figure 28.3. Cat (*Felis sylvestris*). Domestic, domesticated or self domesticating?*

yet to be undertaken. A similar case can be made for the familiar cat, *Felis silvestris*, though here we have free-living, "feral" commensal, and "domestic" commensal forms (Fig. 28.3). As with pigeons, it is the free-living populations that have been reduced to near extinction, whilst commensal forms flourish at population densities that can exceed those of the free-living populations by two orders of magnitude (Turner and Bateson 1988; Long 2003, 310–22).

So much for commensal biology. The important point here is that the commensal community, whichever species happen to compose that community, are the animals that we see almost daily. They are familiar parts of our lives, of the landscapes that people create around themselves, and of the physical and cultural setting in which human lives are played out. Commensal species are not the exploited livestock of the farm, nor are they the unseen, sometimes almost mythical, species of the dark, wild places. They are all around us, all of the time, adjusting their lives and ecology to ours, and often causing us to adjust ours to them. One view of this process is to see it as an outcome of human sedentism, with the advent of farming and villages creating new niches to which opportunistic species could readily adapt. This view is apparent in the innovative and significant work of Eitan Tchernov (1984), who was the first to investigate the emergence of a commensal small vertebrate community in the Natufian and PPNA (Pre-Pottery Neolithic A). An alternative view, which this paper tentatively proposes, stems from the observation that human beings seem to have a strong predisposition to take an interest in, and to become involved with, other species. Maybe this is an outcome of exactly the process investigated by Tchernov and others; the other species made themselves our neighbours, and we took note of them and incorporated them into our lives. However, this is somewhat contradicted by the fact that companion animals and symbolic animals have been adopted by human societies all over the world, including hunter-gatherer groups that have never adopted the sedentism that, on one model at least, would be fundamental to the commensal niche, and that have no cultural connection with the Near East and the PPNA. The important role of dingoes in Australian hunter-gatherer societies is well-known, and many equatorial forest peoples have adopted monkeys and (especially) parrots. It is for these reasons that I propose that inter-species affiliation is a fundamental behavioral trait of modern *Homo sapiens*. If that is so, then there is no reason why commensalism should be a phenomenon of settled, *i.e.* Neolithic and later, communities.

To put that another way, if the proposition that humans have been predisposed to inter-species affiliation since our emergence as a species is credible, then we can hypothesize that evidence of that affiliation will be apparent in the archaeology of hunter-gatherer groups. Testing that hypothesis presents a number of problems, not least the survival and recovery of sufficiently high-quality data. It is unlikely that the species that occupied the commensal niche associated with a group of hunter-gatherers would be the same species as would occupy the same niche associated with sedentary farmers in the same region, as the feeding and nesting/roosting opportunities would be quite different. Indeed, commensalisms with hunter-gatherers may impose quite particular requirements, either of mobility, which could be actively facilitated by the people concerned, or of seasonal opportunism, species switching back and forth between a synanthropic niche and "the wild" as human groups moved in and out of their range. In the former case, it is easy to see how a "mobile commensal" canid would quickly become the "domestic" dog. In the latter case, Driver's (1999) discovery of articulated raven skeletons in Palaeoindian levels at Charlie Lake Cave, British Columbia, is of some interest, as it led Driver to suggest that the ravens had some particular role in the lives of those people. Or maybe *vice versa*?

It is clear from the archaeological record that some commensal species were highly successful in accompanying people over considerable distances, both overland and across the oceans. At Ndondondwane, South Africa, Voigt and von den Driesch (1984) noted the presence of black rat (*Rattus rattus*) in Iron Age levels, showing that this versatile rodent had spread down the East African coast, presumably with maritime traders, and then inland through a landscape that must have been rich in predators but poor in rat habitat. Although Iron Age peoples of southern Africa were farmers, nomadic pastoralism predominated, not the sedentary agriculture that seems to have been so attractive to commensal rodents in the Near East. Further evidence of the versatility of rats comes from the western Pacific region, where rats (*Rattus tanezumi, R. exulans*) accompanied the earliest Polynesian voyages of exploration and settlement (Long 2003, 179–84, 198–9; Barnes *et al.* 2006; Wilmshurst and Higham 2004). Two questions remain to be resolved: was that spread a result of opportunistic stow-away rats or the deliberate movement of rats by people, and did any other species accompany humans around the western Pacific? Civet species (*Paradoxurus* and *Paguma* spp.) show distributions that clearly indicate some degree of past vicariance (variation that results from the geographic separation of populations), raising the interesting possibility that they may have been deliberately moved around as a useful predator of the rats that were enthusiastically island-hopping (Long 2003, 301–3; pace Grayson 2001)

Apart from opportunistic hitch-hiking by "vermin", another process may also have been at work. Do peoples who are colonising new lands, whether in continental interiors or offshore islands, translocate something of their familiar commensal community not simply for functional reasons (pest control, food) but in order to put in place something familiar and "known" from their "homeland"? European settlers in 19th century North America took small European birds with them, the source of the house sparrow (*Passer domesticus*) and starling (*Sturnus vulgaris*) populations on the US eastern seaboard today (Long 1981, 356–82). Those animals were (mostly) not "stow-aways," nor were they sacred or functional, yet they were considered to be important. In part, no doubt, that was a matter of familiarity, of bringing something from 'home' to the new lands. Maybe, too, there is symbolic importance in animals that move freely between the domestic environment and the wild, a role that commensal animals fulfil today (cats, foxes, sparrows), and a role that could be assured in the new land by introducing a familiar species to occupy that role. Such culturally-mediated vicariance (and I apologise for introducing that term) may be represented in the zooarchaeological record. To return to the hypothesis set out above, the deliberate translocation of commensal animals by hunter-gatherers may be most apparent when new lands are being colonised, focussing our attention on the Palaeoindian and European Upper Palaeolithic records.

In conclusion, this topic has a wider significance beyond its importance to zooarchaeology. The world is now full of people, and most populations of most land animals (and even some marine taxa) are subject to pressures that favour synanthropic adaptations. Those species that can adapt to living alongside people will be the 'winners' over the coming century. In order to manage that process, so as to minimise the damage to biodiversity that may otherwise result, we need to understand its time-depth, and the extent to which the formation of commensal communities is both an outcome of our ecology and a deliberate cultural act, and a fundamental feature of human interaction with the rest of the biosphere.

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